DRAFT FINAL
GRADEFILL WORK PLAN
PHASE I
LANDFILL 2
FORT CARSON, COLORADO

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Prepared for:
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Omaha District

Prepared by:
Rust Environment & Infrastructure
Englewood, Colorado 80111

Rust Project No. 55253.000 WBS 743

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Rust Environment & Infrastructure
5575 DTC Parkway, Suite 200
Englewood, Colorado 80111

Prepared by:

Mark Yaskanin, P.E.
Design Engineer

Mark Witczak
Project Engineer

Scott Olson
Project Engineer

Donna Fabyanic
Project Coordinator

Reviewed by:

John A. England, P.E.
Project Manager

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Recipients		Copies
1.	U.S. Army Corps of Engineers Omaha District ATTN: CENWO-ED-EA (Linda White) 215 N. 17th Street Omaha, Nebraska 68102-4978	4
2.	Mr. James Henderson DIR Environmental Compliance and Management 801 Tevis Street Fort Carson, Colorado 80913-4000	3
3.	Colorado Department of Public Health and Environment ATTN: Harlen Ainscough HMWMD-SWIM-B2 4300 Cherry Creek Drive South Denver, Colorado 80222	2

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LIST OF ACRONYMS AND ABBREVIATIONS

CCR	Code of Colorado Regulations
CDPHE	Colorado Department of Public Health and Environment
CQA	Construction Quality Assurance
EPA	U.S. Environmental Protection Agency
FLPM	Field and Laboratory Procedures Manual
IWTP	Industrial Wastewater Treatment Plant
LEL	Lower Explosive Limit
OHM	OHM Remedial Services
Part B Permit	RCRA Hazardous Waste Part B Permit No. CO-95-09-29-03
PID	Photoionization Detector
POL	Petroleum, Oil, and Lubricants
PPE	Personal Protective Equipment
PSHM	Project Safety and Health Manager
QA	Quality Assurance
QC	Quality Control
Quanterra	Quanterra Environmental Services
RCRA	Resource Conservation and Recovery Act
Rust	Rust Environment & Infrastructure
SQAM	Site Quality Assurance Manager
SSHP	Site Specific Health and Safety Plan
SWMU	Solid Waste Management Unit
USACE	U.S. Army Corps of Engineers
USAEHA	U.S. Army Environmental Hygiene Agency
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency

1.0 INTRODUCTION

This Work Plan has been prepared by Rust Environment & Infrastructure (Rust), under contract to the U.S. Army Corps of Engineers (USACE), to outline Phase I gradefill activities for Landfill 2 (FTC-006) at the Fort Carson facility. Gradefill activities at Landfill 2 will be conducted in two phases to prepare the landfill site for the installation of a landfill cap. The activities described within this Work Plan address the excavation of landfill materials from areas outside the proposed landfill limits for the placement of an engineered landfill cap.

This Work Plan is submitted to present the gradefill portion of the cap design that meets Subtitle C requirements for subgrade preparation of promoting drainage and minimizing erosion of the cover (Subpart N-264.310). Once the cap configuration is approved by the Colorado Department of Public Health and Environment (CDPHE), the final elevations will be completed, and a work plan for cap installation and Phase II of gradefill activities will be finalized for use in construction. The subgrade preparation activities presented in this Gradefill Work Plan are applicable to any cap profile and will, therefore, be unaffected by potential future changes in cap design. Specific material quantities will be calculated for the installation of the approved cap configuration and included in the Final Cap Installation Work Plan and on the final Design Drawings.

1.1 GENERAL FACILITY INFORMATION

Fort Carson is located in east-central Colorado, adjacent to the eastern flank of the Rocky Mountain Front Range. The installation is approximately eight miles south of Colorado Springs and occupies over 220 square miles. Fort Carson is an active military training installation for both weapons qualification and field training. The primary mission of Fort Carson is the training and readiness of all assigned and attached troops to ensure combat-readiness. The principal industrial operation at Fort Carson has been the repair and maintenance of vehicles and aircraft.

1.2 LANDFILL 2 SITE DESCRIPTION

The Cantonment Area is bounded on the northeast by Interstate Highway 25, on the north by the Fort Carson Reservation boundary, and on the east by Colorado State Road 115. The site facility

pertaining to this project is Landfill 2 (FTC-006), which is located east of the Cantonment Area, SE 1/4, Sec 15, T15S, R66W. The site was reportedly operated between 1960 and 1978 as a combined trench and fill landfill. The trenches were supposedly oriented perpendicular to the topographic slope. The types of waste reportedly received at the site include mixed loads of sanitary wastes, sludges, and waste petroleum, oil, and lubricants (POL).

The U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) reported that the water quality of a downgradient monitoring well showed evidence of leachate migrating from this site. This conclusion is supported by a report from the U.S. Army Environmental Health Agency (USAEHA) Geohydrologic Study in 1985 (Phase 2 Geohydrologic Study #38-26-0392-87, dated August 1985) which stated that the site contained elevated levels of Total Organic Carbon (TOC), Chemical Oxygen Demand (COD), nitrates and nitrites. It was concluded in a USAEHA, 1988 (Groundwater Quality Study #38-26-0897-89, Investigation of Closed Landfills, dated June and November 1988) evaluation report of Solid Waste Management Units (SWMUs) at Fort Carson that leachate generated from this site had apparently migrated to the groundwater. Therefore, this project was initiated to develop construction plans to cap the landfill.

The Resource Conservation and Recovery Act (RCRA) Hazardous Waste Part B Permit No. CO-95-09-29-03 (Part B Permit) for Fort Carson (September 29, 1995) identifies two landfill SWMUs within the fenced landfill area evaluated in this Design Analysis as Landfill 2 (FTC-006). Sheet 17 of Map 9-8 of the Part B Permit identifies SWMU 2 - Landfill 2 as comprising the easternmost section of the fenced landfill area and SWMU 3 - Landfill 3 as comprising the western portion of the fenced landfill area, including the prominent side slope, which can be seen when reviewing the existing topography (see Figure 1). SWMU 3 - Landfill 3 reportedly received the same type of waste materials as discussed above. Fort Carson has submitted a modification to the Part B Permit combining Landfills 2 and 3.

The pre-design investigations identified one continuous landfill within the fence for Landfill 2. As a result, both SWMU 2 and SWMU 3 represent a single continuous landfill that is referred to as Landfill 2 in the remainder of this Work Plan and in the Design Drawings.

1.4 OBJECTIVES

The purpose of this Work Plan is to describe Phase I gradefill activities which will be performed as an initial stage to address subsequent closure of Landfill 2. This Work Plan does not identify or discuss the capping or the additional corrective actions that may be required to address the migration of any chemicals in groundwater at these landfills.

Section 2.0 of this Work Plan provides an overall summary of the pre-design activities. Section 3.0 describes the project organization. A more detailed description of the work activities is presented in Section 4.0, and a schedule is discussed in Section 5.0. References are provided in Section 6.0. The Task-Specific Safety and Health Plan, Task-Specific Environmental Protection Plan, Waste Management Plan, Storm Water Pollution Prevention Plan, Task-Specific Quality Assurance (QA)/Quality Control (QC) Plan and Specifications are attached as appendices.

2.0 PRE-DESIGN ACTIVITIES

2.1 LANDFILL 2 PRE-DESIGN ACTIVITIES

During preparation of the landfill design, additional field activities were conducted to delineate the boundaries of the landfills, evaluate the geotechnical characteristics of the cover and foundation soils, evaluate the presence of landfill gas, and evaluate groundwater characteristics. The results of this investigation were used during the preparation of the Design Analysis Report. The field methods used during the pre-design field investigation included:

- Field Mapping;
- Geophysical Analysis;
- Soil Gas Sampling;
- Soil Boring Drilling;
- Groundwater Sampling; and
- Trenching.

Complete descriptions of the field methods used and their respective results are provided in the respective Design Analysis Report. The following sections summarize the pre-design investigation findings for Landfill 2 presented in the report.

At Landfill 2, field mapping was conducted, a geophysical survey was conducted, trenches were excavated, and geotechnical borings were drilled in an effort to define the limits of waste. Trenching was performed at 24 peripheral locations and near the southwest corner of Landfill 2. Figure 5 of the Landfill 2 Design Analysis provides locations of the trenches, as well as a summary of the materials encountered.

The field mapping task at Landfill 2 was very effective at determining the limit of waste. Field mapping was aided by the availability of site topography maps, which were prepared from air photos of the site taken on December 14, 1994. A geophysical survey using a continuous wave electromagnetic sensor was performed to supplement field mapping efforts; however, it was not possible to define a clear limit of the landfill materials using results of the survey.

Based on the combined results of field mapping, geotechnical investigations, and exploratory trenching, the existing limit of waste is believed to encompass approximately 98 acres. Figure 1-1 shows the existing conditions and the estimated limit of waste.

The geotechnical field investigation was performed to gather information on the general characteristics of existing fill and native materials and to supplement the trenching in determining the limits of waste. Forty-three exploratory borings were drilled and logged at the locations shown on Figure 3 of the Design Analysis for Landfill 2. Results and interpretations of information gathered during the geotechnical field investigation were utilized to supplement trenching data in determining the limit of waste, and in geotechnical calculations presented in the Design Analysis. Boring information and permeability testing indicated that portions of the existing cover at Landfill 2 did not meet the cover specifications for closure of a RCRA site.

The soil gas survey for Landfill 2 consisted of collecting and analyzing samples from 105 different locations across the site. Results of the soil gas survey can be found in Figure 2 of the Design Analysis for Landfill 2. Methane was present at only 13 of the 105 survey locations. As a guideline, the area was compared to Solid Waste Landfill Regulation 6 Code of Colorado Regulations (CCR) 1007-2 Section 2.3.1 which sets a limit of 5 percent methane at the property boundary. Although only four sample points exceeded 5 percent methane, all are within the landfill boundary. Methane control measures will not be incorporated into the design. In addition, permanent gas monitoring probes will be installed at several locations around the perimeter of the landfill.

In order to evaluate the potential impacts on groundwater quality at Landfill 2, existing monitoring wells were sampled and direct push groundwater samples were collected. Sample locations are shown on Sheet C-3 of the Gradefill Plans for Landfill 2. A summary of analytes with concentrations above groundwater standards is included on Figure 6 of the Design Analysis - Landfill 2 (Rust, May 1996). The groundwater investigation showed that inorganic contaminants with concentrations above groundwater standards were found in samples from most locations, while organic contaminants with concentrations above groundwater standards were detected in only one well and two direct push samples in the southeast portion of the site.

3.0 PROJECT ORGANIZATION

3.1 RUST PROJECT ORGANIZATION

Figure 3-1 illustrates the Rust project management organization and primary lines of communication for the field activities. Rust is responsible for the overall project coordination with USACE and Fort Carson. Rust will also provide construction oversight of the activities conducted by OHM Remedial Services (OHM) during cap construction. OHM is responsible for management of construction activities and health and safety.

3.2 PROJECT TEAM

The Program Manager, Mr. John Shaler, will be responsible for coordination and management of the Total Environmental Restoration Contract (TERC) contract. The Chief Project Manager, Mr. Mark Scott, is responsible for the overall coordination of Fort Carson related projects. The focal point of the Project Team is the Project Manager, Mr. John England, who is responsible for the overall coordination and successful completion of all activities on this project, both administrative and technical.

Mr. Scott Olson will assist Mr. England on this project as the Engineering Task Manager. Mr. Olson will provide day to day coordination and supervision with respect to engineering/design related aspects of the project. Mr. Olson has been directly involved with the Work Plan and design document development, and will be directly involved with implementation of field activities and data evaluation. Mr. Olson will be assisted by the Senior Design Engineer, Mr. Mark Yaskanin.

Mr. Yaskanin has been involved with the project throughout the design phase. Questions about the design will be directed to Mr. Yaskanin. If any design changes are required, they will be reviewed and approved by him. Mr. Yaskanin will be available on an as-needed basis throughout construction of the caps.

The Project Safety and Health Manager (PSHM) is Ms. Wendy Johnson. Ms. Johnson is responsible for implementing the project Site Specific Health and Safety Plan (SSHP) and monitoring the project

for compliance with SSHP requirements. The PSHM will be alerted in the event that site conditions which might require modifications to the SSHP field operating procedures are encountered. Ms. Johnson, or her designated representative, will perform site visits and audit field operations to monitor compliance with SSHP requirements.

The Site Quality Assurance Manager (SQAM), Mr. Rick Jennings, will have primary responsibility for the performance and documentation of all field activities and for direct coordination with subcontractors and Fort Carson personnel as the field work is conducted. Mr. Jennings will ensure that construction activities follow the procedures presented in the Work Plan. Mr. Scott Sumner, the Rust Corporate Quality Assurance Manager, will serve as a technical resource for Mr. Jennings on an as needed basis.

OHM has been selected as the construction contractor. They will be responsible for mobilization/ site preparation, cap construction, and site restoration activities. The OHM Project Manager is Mr. Bob Hulet. Mr. Hulet is responsible for managing and scheduling all construction work and coordinating activities with the Rust Construction Quality Assurance (CQA) Task Manager. The OHM Quality Control System Manager (QCSM), Mr. Vien Perez, will report to Mr. Hulet and will be responsible for daily QC activities. The OHM Health and Safety Coordinator, Mr. Jason Haugh, will be responsible for daily health and safety management.

Quanterra Environmental Services (Quanterra) of Denver, Colorado has been selected as the offsite, fixed base laboratory for waste characterization analysis. The Quanterra laboratory contact is Ms. Jen Allender. Quanterra is fully validated by the Chemical and Materials Quality Assurance Laboratory.

During gradefill activities, the Rust Geotechnical Laboratory in Cincinnati will be used to support construction QA/QC testing. The only anticipated geotechnical testing during gradefill activities is related to the identification of borrow areas. Mr. Ray Steinle is the Rust Geotechnical Laboratory contact.

Mr. Cory Oldweiler of Global Environmental Services Inc. will serve as the Certifying Engineer for the project, and will report to John England, the Project Manager. The Certifying Engineer shall provide independent verification that construction work was performed in compliance with the approved drawings and specifications. In addition, the Certifying Engineer may assist in directing the efforts of the SQAM and CQA staff.

4.0 GRADEFILL ACTIVITIES

This section describes the detailed project scope for gradefilling at Landfill 2. The final version of this Work Plan along with the final Design Drawings and Specifications will be used during field activities. Gradefill activities shall be conducted in accordance with the final approved Work Plan, Design Drawings, and Specifications. The project scope of work includes mobilization and site preparation, gas probe installation, gradefilling, borrow area sampling QA/QC, and demobilization.

4.1 MOBILIZATION AND SITE PREPARATION

Prior to mobilization to the site, the information developed during the final design and estimate will be used to identify the sources of any long-delivery items. Purchase requisitions will be prepared for the procurement packages and competitive bids will be solicited for materials and equipment.

A summary of mobilization activities is included in this Work Plan, however, a detailed mobilization plan shall be developed by OHM and submitted to Fort Carson and USACE through Rust for approval prior to project startup. The mobilization plan shall include site layout drawings depicting locations of central administrative facilities, support areas, site-specific decontamination pads, sanitary facilities, equipment storage areas, exclusion zones, borrow areas, and transportation routes. The mobilization plan shall address the handling of sanitary wastes, connection of temporary utilities, obtaining permits, fencing and security, waste storage areas, and the delivery and receipt of materials and equipment. The mobilization plan will also identify the locations and design of temporary crossings of the existing drainage channels.

Upon approval of USACE and Fort Carson to commence the project, mobilization will begin with the preparation of storage areas, operations support areas, and access roads. If required, these areas shall be graded to provide all weather access and facilitate drainage. Gravel shall be placed to prevent tracking of mud onto paved roadways. One self-contained decontamination/break trailer will also be mobilized to the landfill site. Several connex boxes will also be utilized for storage activities. One connex will be used for health and safety supplies and one will be used for tool storage. An additional connex will be used for personnel decontamination and equipment storage when work is being

performed at a location outside the vicinity of the self-contained decontamination trailer. The decontamination pad will be mobilized at the landfill for the purpose of decontaminating equipment and tools. Construction details for the decontamination pad are presented on Drawing C-7 of the Gradefill Plan.

Health and safety equipment and supplies will also be transported to the site. Required monitoring equipment will be set up outside the exclusion zone. Prior to any personnel entering fenced areas, site-specific orientation and training will be conducted as identified in Appendix A. This will include facility and project rules and requirements, project objectives, health and safety issues, personal protective equipment (PPE) requirements, and emergency protocols. If an upgrade from Level D to Level B PPE is required, construction equipment will be equipped with air bottle racks and shields. These materials will be readily available for immediate transportation to the site. All equipment will be inspected upon arrival at the site to ensure it is in proper working order and free of contamination. Mobilization activities will be coordinated with Fort Carson personnel with respect to schedule and transportation routes onsite.

4.2 GAS MONITORING PROBE INSTALLATION

Preparatory activities will include the installation of four gas monitoring probes at perimeter locations around Landfill 2. Permanent gas monitoring probes will be installed to monitor the potential migration of landfill gasses. Proposed locations for gas monitoring probes at Landfill 2 are presented in Figure 4-1 and are designed to address concerns relative to the potential migration of landfill gas into buildings and basements. As a result, the proposed locations are concentrated on the southern side of Landfill 2 between the landfill boundaries and the closest buildings.

The gas monitoring probes will be constructed in accordance with the specifications using 1-inch flush threaded polyvinyl chloride (PVC) screens and risers. The screened intervals of the probes will vary from 3 to 10 feet depending on local groundwater levels. The bottoms of the gas probes will be generally installed at 1 foot above the groundwater level. The gas probes will be completed with an above ground, locking steel protective surface casing set into a 3x3-foot concrete pad with three

protective abutment posts. Typical construction diagrams are included as Figure 4-2. Installation activities are anticipated to be performed in modified level D PPE as discussed in Appendix A.

Soil cuttings will be containerized in new 55 gallon steel drums. As discussed in Appendix C, the cuttings generally will be disposed at the onsite Fort Carson landfill. If analytical results indicate that the material is hazardous, the soil will be disposed of at a hazardous waste landfill. Soil cuttings generated from the installation of gas probes will not be disposed in Landfill 2 since the proposed locations are outside the boundaries of Landfill 2. Field and laboratory procedures utilized to collect and analyze these samples are described in the Field and Laboratory Procedures Manual (FLPM) (Rust, 1997). Wastewater generated from decontamination activities will be containerized and then sampled in accordance with the Waste Management Plan (Appendix C). The water will be disposed at the onsite Industrial Wastewater Treatment Plant (IWTP) if the wastewater achieves the influent criteria of the IWTP.

Once installed, concentrations of methane and hydrogen sulfide will be monitored at each probe using a portable multi-gas meter. During gradefill and cap construction activities, one reading at each probe will be taken every two weeks. Following completion of construction activities, monitoring will be performed on a weekly basis for the first two months and then on a monthly basis for a period of six months. Following this period, monitoring will be performed quarterly unless elevated levels of methane and hydrogen sulfide are encountered. In this instance the monitoring frequency will remain at once per month. Action levels and equipment requirements are described in Appendix A.

4.3 INITIAL GRADEFILL ACTIVITIES

The initial gradefill activities consist of relocation of landfill materials, predominantly construction debris from outside of the boundaries of existing concrete drainage channels and the fenced boundary of the landfill. In many instances, this will consist of consolidating surficial debris. Refer to Figure 4-4 for areas of landfill materials to be relocated. The excavated landfill material will be used as gradefill within the existing footprint of the landfill to increase the landfill cap slope and provide for adequate surface water drainage. Excavation and placement of landfill material will be carried out with standard excavation equipment, such as trackhoe excavators and trucks, and regrading of

excavated areas will be performed in accordance with the final Design Drawings. Gradefilling activities include construction surveying, placement of erosion protection, and grading/fill placement.

4.3.1 Construction Surveying

Prior to construction, four or more bench marks will be established at the landfill for both vertical and horizontal control of work. Construction stakes shall then be set on a 100-foot grid, along breaks and along significant structures (edge of cap, ditches, roads, etc.) for the preparation of the cap subgrade. The bench marks will be set by a Registered Professional Surveyor licensed in the State of Colorado. Surveying shall be conducted using the State Plane Coordinates (in feet) Colorado Central Zone based on NAD 83 for horizontal coordinates, and vertical elevations shall be reported in NAVD 88 mean sea level.

In general, the project control survey will meet or exceed the horizontal and vertical accuracy criteria as defined by the Standards and Accuracy and General Specifications of Geodetic Control Surveys established by the U.S. Department of Commerce. Horizontal control positions will be within Third Order, Class I accuracy and accomplished by those standards. The closing error of control leveling for the survey/monuments shall not exceed 0.05 foot times the square of M, where M is the miles of leveling. In other words, the accuracy of the bench marks depends on the leveling distance. The accuracy for the bench marks are specified in the Construction Staking Specification (Specification 1050), which is included in Appendix F.

4.3.2 Field Screening During Gradefill Activities

During excavation and relocation of landfill material, monitoring will be conducted to evaluate site conditions and to determine if hazardous waste may be present. Monitoring will include visual observations of excavated landfill material and real-time air monitoring. The excavated material will be visually inspected as it is excavated and any indications of potentially hazardous waste such as drums or labeled containers, will be noted. A photoionization detector (PID), lower explosive limit (LEL) meter, and an oxygen level meter will be used to monitor the excavation environment. If hazardous conditions are present (i.e., LEL reading greater than 10 percent, oxygen level less than 19.5 percent or greater than 23.5 percent, or PID reading greater than 25 parts per million), the work

area will be evacuated and the Project Health and Safety Officer will be contacted to further evaluate the situation. As discussed in the SSHP (Appendix A), detector tubes will be used to evaluate concentrations of specific compounds if PID readings are greater than 5 parts per million. Any waste identified as potentially hazardous based on the meter readings or visual observation will be segregated and containerized. Analysis will then be conducted to determine the actual waste characteristics of the material and the proper method of disposal will be determined.

4.3.3 Placement of Erosion Protection

Prior to actual earthwork at the site, temporary erosion protection materials shall be placed along the perimeter of the landfill. Erosion protection shall include silt fencing, straw bale sediment barriers, and check dams. The Design Drawings for Landfill 2 grading activities illustrate the locations for the placement of erosion protection and provide details of erosion control structures. If required, protective structures for trees shall be installed.

After the Phase I gradefill activities are completed at Landfill 2, disturbed areas outside the perimeter of the capping surface will be revegetated using native grasses as part of erosion protection activities. Seed mixtures and placement are described in detail within the Construction Specification for general seeding (Appendix F). Erosion control materials, where needed, will be placed to promote seed establishment. Erosion control materials include vegetative mulching, erosion matting, silt fencing, straw or hay bales as defined by the seeding specification. Figure 4-4 presents the location of erosion controls for the gradefill activities including silt fences. Seeding areas will be protected against traffic or other use by erecting barricades and installing signs around the areas.

4.3.4 Landfill 2 Gradefill

The Grading Plan for Landfill 2 is based on the installation of a new cap in some areas and enhancing the existing cap in the central portion of the landfill. The landfill will be covered with an evapotranspiration cap that has a thickness of approximately 3 to 5 feet. Figure 4-3 presents the profile of the conceptual design of the evapotranspiration cap. The specific parameters of the evapotranspiration cap design and the modifications to the existing cap are currently being finalized. A Work Plan will be developed to govern the installation of the cap and enhancement of the existing

cap at Landfill 2, but the conceptual design is adequate for the development of the subgrade over the northeast portion of the landfill.

The Subtitle C requirements for post-closure of a landfill do not entail specific requirements for gradefill activities other than to promote drainage and minimize erosion. Environmental Protection Agency (EPA) guidance documents indicate that the slope of a final cover should be between 3 and 5 percent (EPA, 1989). The regrading of Landfill 2 will provide for an approximate 2.5 percent minimum slope.

Approximately 77,000 cubic yards of landfill material will be excavated and relocated. The final Design Drawings will include the limit of landfill and the final grades, and shall be used as a guideline for material excavation and relocation. Figure 1-1 illustrates the estimated limits of waste, and Sheet C-3 of the Gradefill Plans for Landfill 5 identifies the approximate extent of the Landfill 2 grading. Any landfill material observed to extend beyond the limit of excavation shown on the final Design Drawings shall be relocated within the final limit of the landfill. Preparation of the landfill subgrade (gradefilling) will include proof rolling as specified in Appendix F (Specification 02222).

The first gradefill activities consist of pre-compacting the two areas which will receive gradefill and adjusting the grades along the existing concrete channels in these two areas so that the final cap will match the channel grade. This action will result in the relocation of approximately 6,000 cubic yards of landfill materials. The remaining 71,000 cubic yards will be relocated from outside the existing drainages and landfill fence.

The exact amount of surficial debris that will be encountered during this process is uncertain due to the non-uniform nature of the placement of the debris. Due to this uncertainty, the grades in the northern fill area will be achieved prior to placing relocated landfill wastes in the southern fill area. The final subgrade elevation in the southern fill area will be adjusted based on the actual quantities of surficial debris relocated. Following the relocation of surficial debris, the area will be regraded to provide positive drainage. In the event that the construction debris extends several feet below the

ground surface in any of these areas, the placement of onsite native soil as backfill may be required to provide adequate drainage.

4.4 DEMOBILIZATION

Demobilization will occur throughout the project as various activities are completed and equipment is no longer needed. All equipment leaving the site will be decontaminated by steam cleaning. Waste materials will be containerized for temporary storage and transportation to the disposal site in accordance with the Waste Management Plan (Appendix C). All unused materials and supplies will be returned for credit or stored for use on other Fort Carson projects. Government furnished equipment will be returned to storage at Fort Carson. Contract closeout shall require the disconnection and removal of all temporary utilities from the site, as well as the removal of support area facilities and materials. All disturbed areas will be graded and revegetated after being vacated. Demobilization activities will be coordinated closely with Fort Carson personnel with respect to schedule and transportation routes of Fort Carson.

4.5 QUALITY CONTROL/QUALITY ASSURANCE

Throughout the construction of the landfill cap, QA/QC procedures will be followed in an effort to complete the project in strict conformance with the final Work Plan, Design Drawings, and Specifications. Rust will be responsible for CQA, which includes checking the conformity of the work and providing documentation to show that the work was completed in accordance with project drawings and specifications. OHM will provide QC, which includes ensuring that the materials and workmanship meet the requirements of the drawings and specifications. A Task-Specific QA/QC Plan has been developed (Appendix E) to establish the QA/QC objectives and describe the procedures that will be implemented to meet the objectives.

5.0 PROJECT SCHEDULE

An overall schedule for gradefilling Landfill 2 is shown in Figure 5-1. Prior to construction start up, a more detailed construction schedule will be prepared and used to track construction progress.

The durations of gradefill activities are based on placing 77,000 BCY of gradefill at Landfill 2. The durations of each activity are based on working four 10-hour days per week. As a result, the approximate duration of the Phase I gradefill activities is ten weeks. This schedule includes precompacting the areas to receive fill, relocating waste materials and regrading the areas where surficial debris is removed.

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USAEHA. Geohydrologic Study (Phase 2 Geohydrologic Study #38-26-0392-87). August 1985.

TABLES

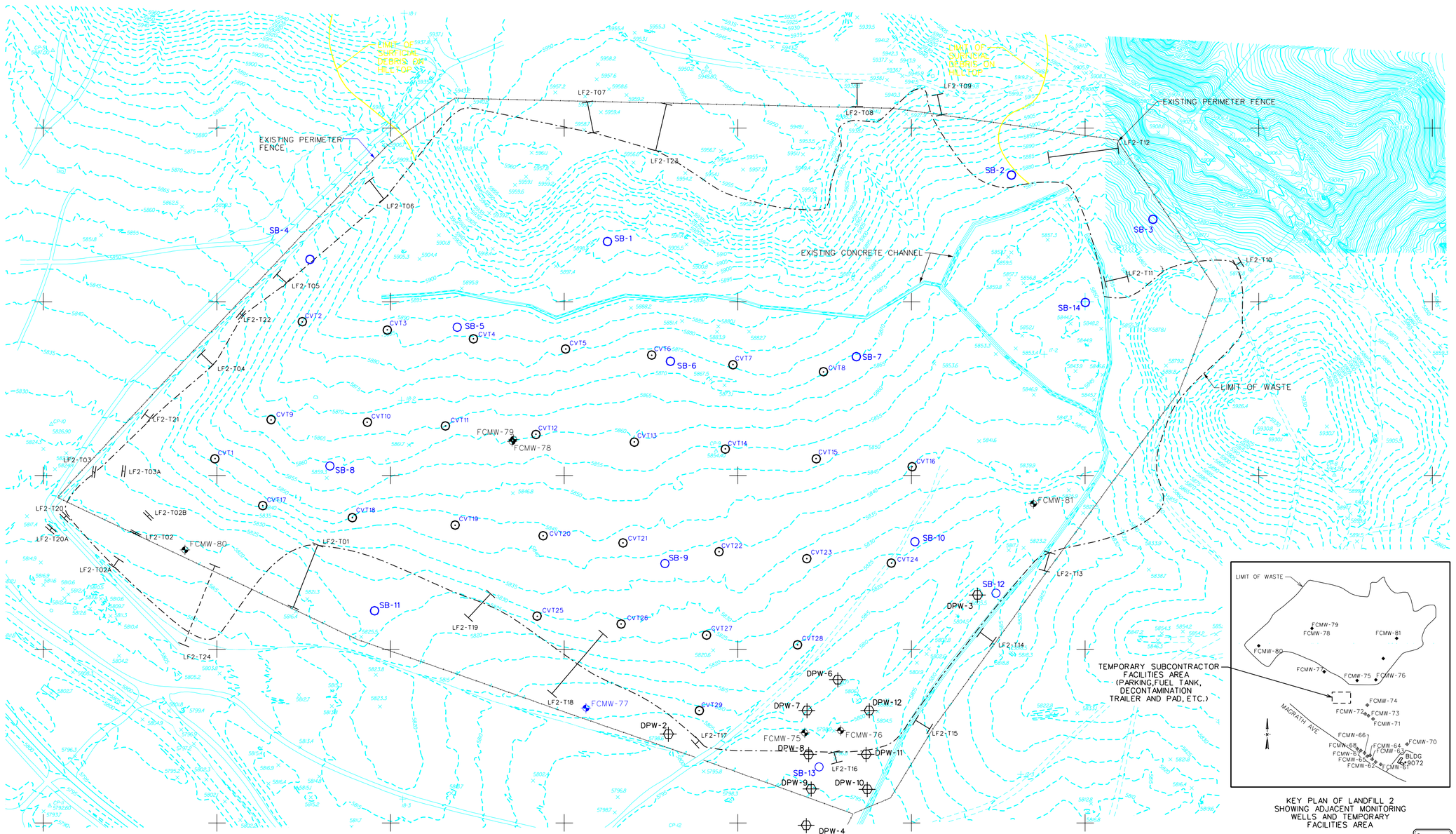
TABLE 4-1
GEOTECHNICAL TESTING TO EVALUATE EVAPOTRANSPIRATION CAP BORROW AREAS

Type of Testing	Frequency of Testing	Method	Reference
Geotechnical Analyses	One sample per 2,500 BCY from each borrow area	Sieve/Hydrometer Analysis	ASTM D 422-63
		Atterberg Limits	ASTM D 4318
Hydraulic Analyses	One sample per material type encountered in each borrow area	Saturated Hydraulic Conductivity - Remolded Permeability	ASTM D 2325-68 (Samples run at 70, 80 and 85 percent standard proctor)
		Moisture Retention Curve - Pressure Plate Method	ASAI Chapter 26 (Curve based on six to eight points)
		Initial Moisture Content	ASTM D 2216
		Dry Bulk Density	ASTM D 2937
		Calculated Total Porosity	ASA1 Chapter 18
Chemical Analyses	One sample per 10,000 BCY from each borrow area (unless visual observations/field screening indicate possible contamination)	Volatile Organic Compounds	SW 846 - 8270
		Semivolatile Organic Compounds	SW 846 - 8260
		Target Analyte Metals	SW 846 - 6010, 7000

Notes:

1. Annual Book of ASTM Standards, American Society for Testing & Materials.
2. Methods for Soil Analysis, Part 1. 1986. American Society of Agronomy.
3. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods SW846. U.S. Environmental Protection Agency.

FIGURES



LEGEND

- DPW-4 — APPROXIMATE DIRECT PUSH WATER SAMPLING LOCATION
- FCMW-81 — LOCATION OF EXISTING MONITORING WELL
- SB-3 — LOCATION OF GEOTECHNICAL BORING
- CVT-1 — LOCATION OF CAP VERIFICATION TEST BORING
- LIMIT OF WASTE
- LIMIT OF SURFICIAL DEBRIS ON HILLTOP
- SURVEY CONTROL POINT
- TRENCH LOCATION

N

NOTES:

1. NO KNOWN UTILITIES EXIST WITHIN THE AREA OF THE DRAWING SHOWN.
2. HORIZONTAL COORDINATES ARE MODIFIED STATE PLANE COORDINATES COLORADO CENTRAL ZONE BASED ON NAD83 WITH A DATUM ADJUSTMENT FACTOR OF 1.00026853 ELEVATIONS SHOWN ARE MEAN SEA LEVEL NAVD88 CONTROL BY MONTGOMERY-PHILLIPS, INC.

DATE OF PHOTOGRAPHY: DECEMBER 14, 1994

PHOTO SCALE: 1:3600'

KEY PLAN OF LANDFILL 2 SHOWING ADJACENT MONITORING WELLS AND TEMPORARY FACILITIES AREA

SCALE: 1 INCH = 200 FEET
100' 0 100'

$$ – THINK VALUE ENGINEERING – $$

Revisions			
Symbol	Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

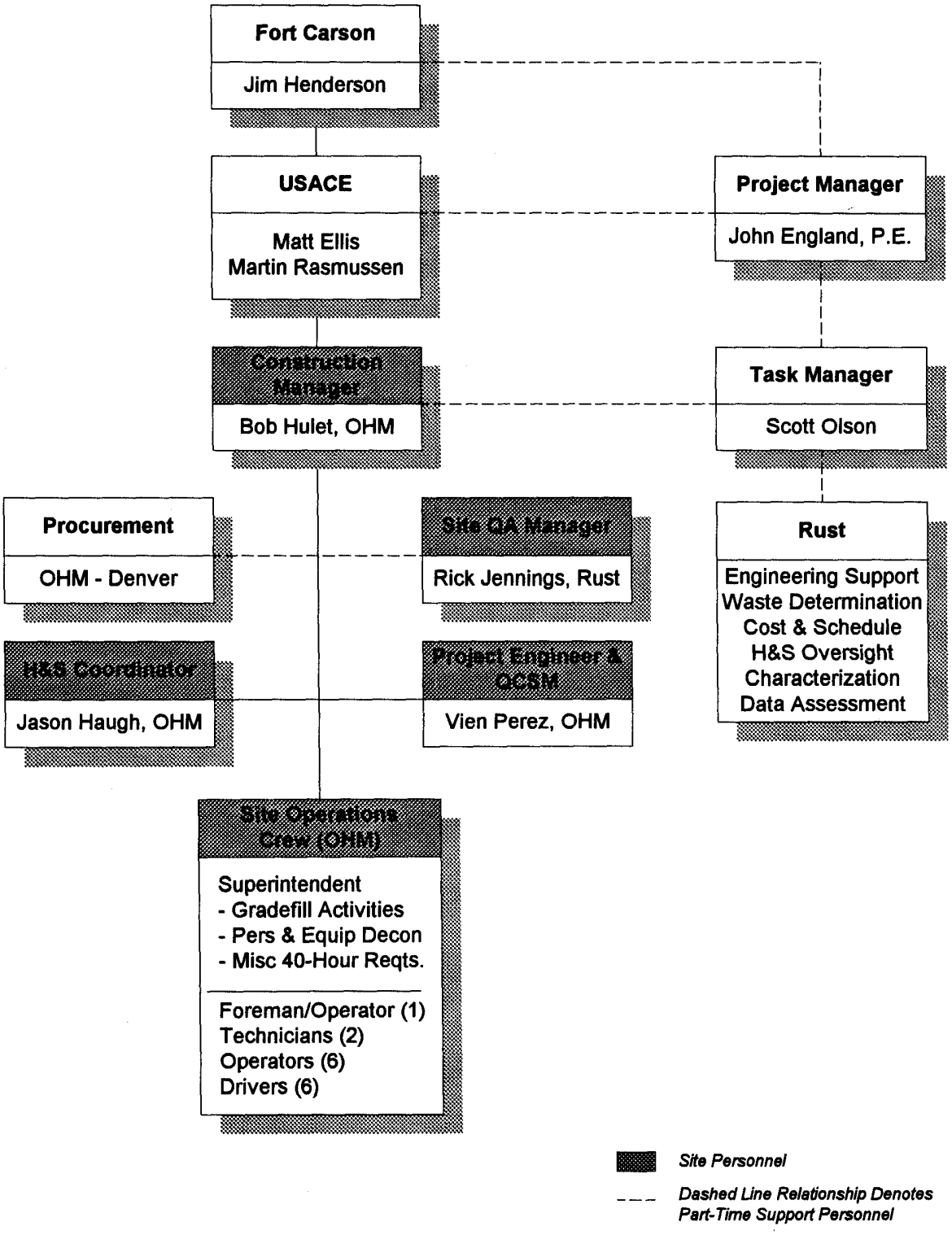
Designed by: MF	FORT CARSON COLORADO
Drawn by: PB	**FIGURE 1-1**
Checked by: MY	**EXISTING CONDITIONS WITH SUBSURFACE EXPLORATION LOCATIONS**
Reviewed by: JE	LANDFILL No.2 (FTC-006)
Submitted by:	Plot Scale Ratio: Date: JANUARY 1998
	Design File: LF2EXCON.DGN
	Spec. No.: DACW 45 Drawing Code:
	Contract No.: DACW 45

Sheet reference number:

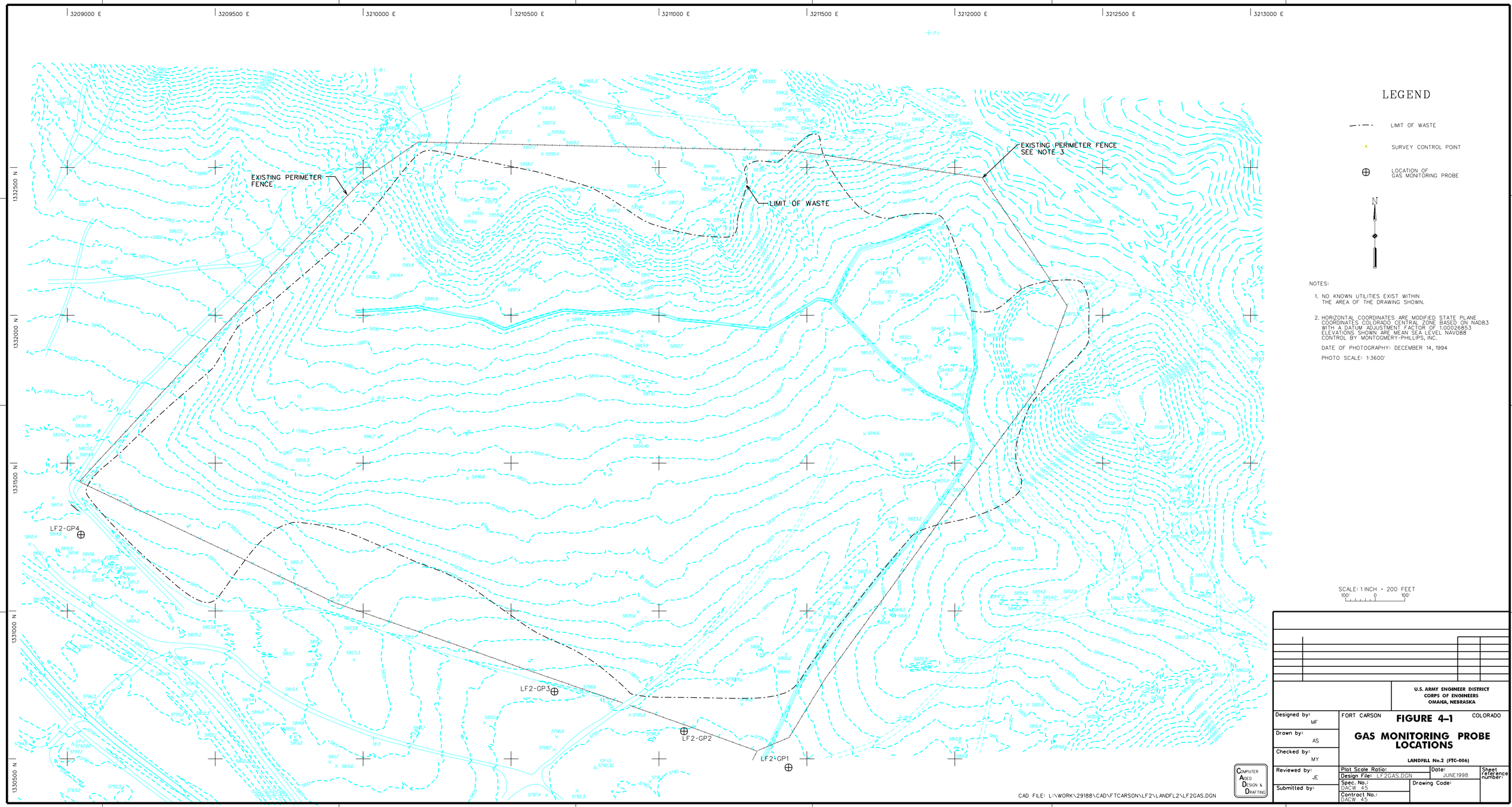
COMPUTER AIDED DESIGN & DRAFTING

CAD FILE: L:\WORK\29188\CAD\FTCARSON\LF2\LANDFL2\LF2EXCON.DGN

FIGURE 3-1
LANDFILL 2 GRADEFILL
ORGANIZATION PLAN



S:\PROJECTS\TERC-FTC\VISIODOC\FIG1.VSD



LEGEND

- LIMIT OF WASTE
- SURVEY CONTROL POINT
- LOCATION OF GAS MONITORING PROBE

N

NOTES:

1. NO KNOWN UTILITIES EXIST WITHIN THE AREA OF THE DRAWING SHOWN.
2. HORIZONTAL COORDINATES ARE MODIFIED STATE PLANE COORDINATES COLORADO CENTRAL ZONE BASED ON NAD83 WITH A DATUM ADJUSTMENT FACTOR OF 1.00026853 ELEVATIONS SHOWN ARE MEAN SEA LEVEL NAVD88 CONTROL BY MONTGOMERY-PHILLIPS, INC..

DATE OF PHOTOGRAPHY: DECEMBER 14, 1994

PHOTO SCALE: 1:3600'

SCALE: 1 INCH = 200 FEET
100' 0 100'

CAD FILE: L:\WORK\29188\CAD\FTCARSON\LF2\LANDFL2\LF2GAS.DGN

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U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

Designed by: MF	FORT CARSON	COLORADO
Drawn by: AS	**FIGURE 4-1**	
Checked by: MY	**GAS MONITORING PROBE LOCATIONS**	
Reviewed by: JE	LANDFILL No.2 (FTC-006)	
Submitted by:	Plot Scale Ratio:	Date: JUNE1998
	Design File: LF2GAS.DGN	Sheet reference number:
	Spec. No.: DACW 45	Drawing Code:
	Contract No.: DACW 45	

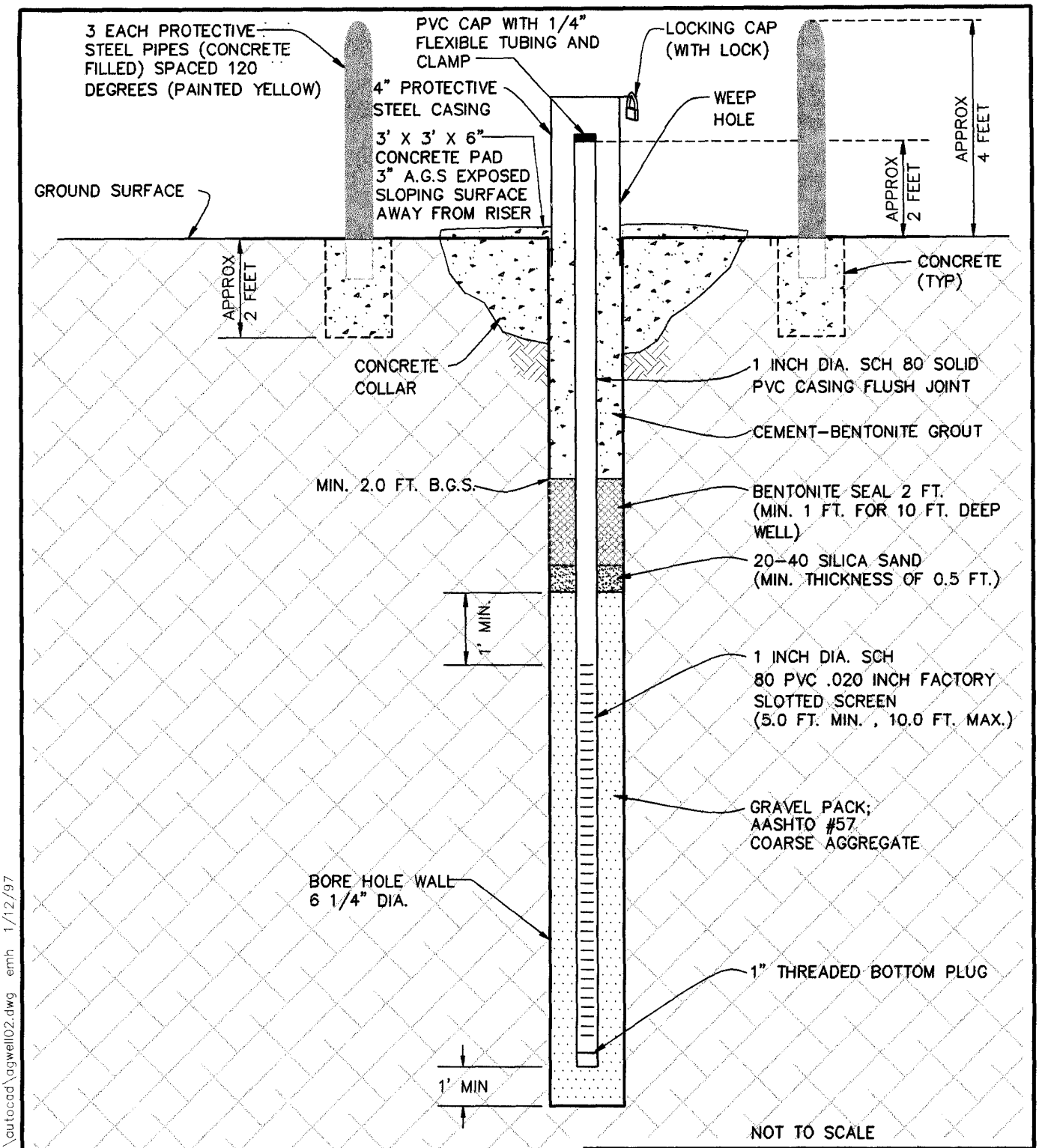

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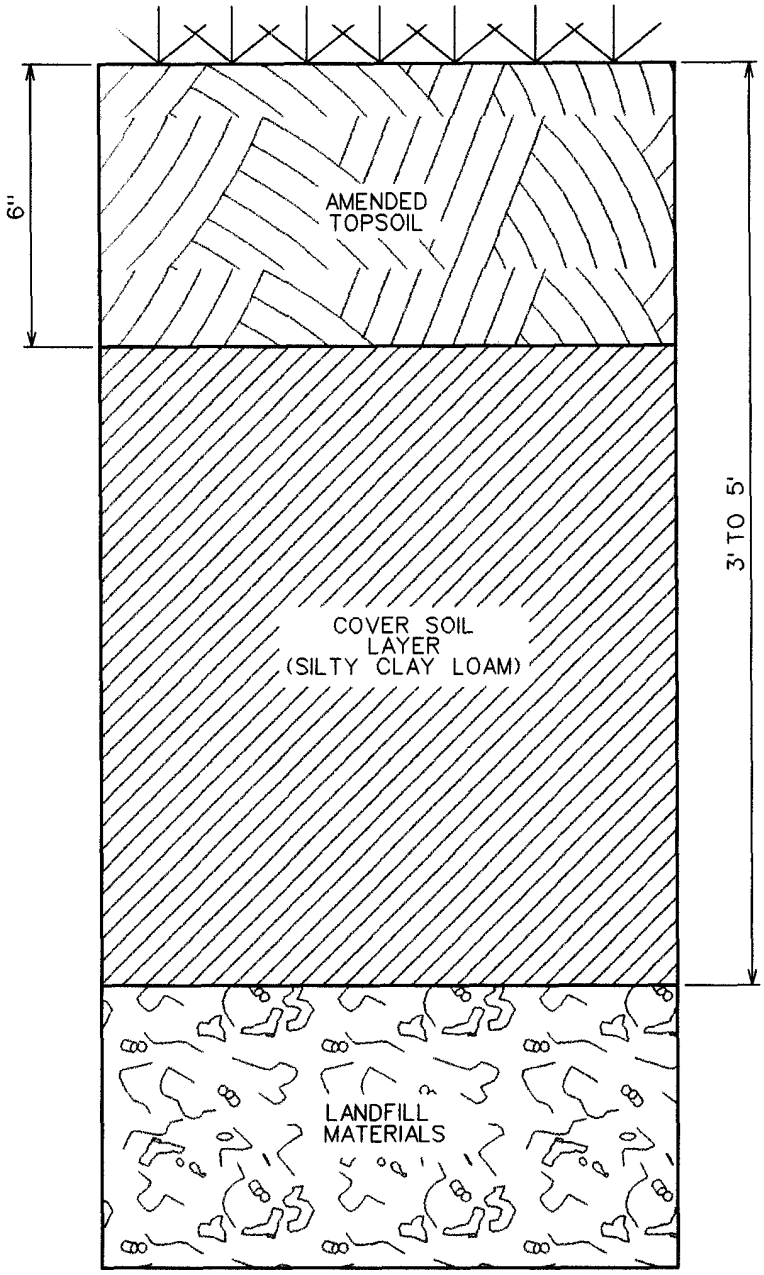
FIGURE 4-2
GAS PROBE MONITORING WELL
MIN. REQUIREMENTS FOR LANDFILL 2

FORT CARSON
COLORADO SPRINGS, COLORADO

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

RUST ENVIRONMENT & INFRASTRUCTURE

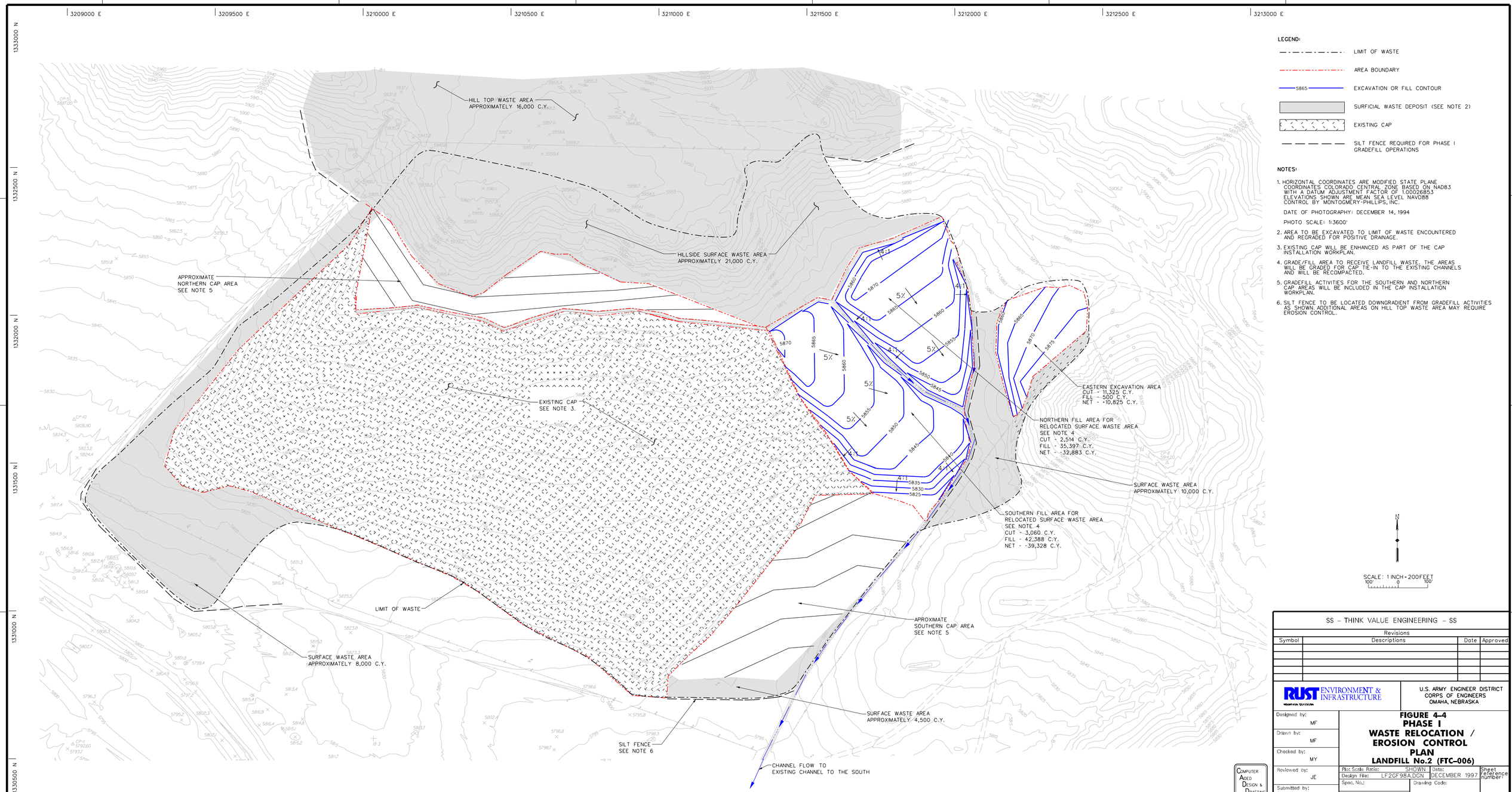


RUST ENVIRONMENT & INFRASTRUCTURE

FIGURE 4-3

CONCEPTUAL
EVAPOTRANSPIRATION CAP PROFILE
LANDFILL 2

FTCARSON\PITS\MICROSTA\FIGS\EVAPCAP.DGN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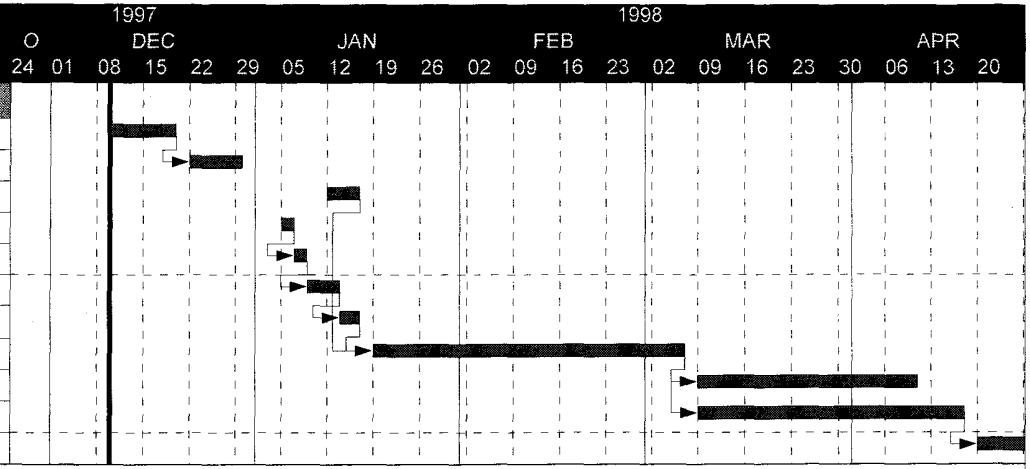
3209500 E
3210000 E
3210500 E
3211000 E
3211500 E
3212000 E
3212500 E
3213000 E
1333000 N
1332500 N
1332000 N
1331500 N
1331000 N
1330500 N
HILL TOP WASTE AREA
APPROXIMATELY 16,000 C.Y.
HILLSIDE SURFACE WASTE AREA
APPROXIMATELY 21,000 C.Y.
APPROXIMATE
NORTHERN CAP AREA
SEE NOTE 5
EXISTING CAP
SEE NOTE 3.
EASTERN EXCAVATION AREA
CUT - 11,325 C.Y.
FILL - 500 C.Y.
NET - -10,825 C.Y.
NORTHERN FILL AREA FOR
RELOCATED SURFACE WASTE AREA
SEE NOTE 4
CUT - 2,514 C.Y.
FILL - 35,397 C.Y.
NET - -32,883 C.Y.
SURFACE WASTE AREA
APPROXIMATELY 10,000 C.Y.
SOUTHERN FILL AREA FOR
RELOCATED SURFACE WASTE AREA
SEE NOTE 4
CUT - 3,060 C.Y.
FILL - 42,388 C.Y.
NET - -39,328 C.Y.
LIMIT OF WASTE
SURFACE WASTE AREA
APPROXIMATELY 8,000 C.Y.
APROXIMATE
SOUTHERN CAP AREA
SEE NOTE 5
SURFACE WASTE AREA
APPROXIMATELY 4,500 C.Y.
SILT FENCE
SEE NOTE 6
CHANNEL FLOW TO
EXISTING CHANNEL TO THE SOUTH
LEGEND:
LIMIT OF WASTE
AREA BOUNDARY
5865
EXCAVATION OR FILL CONTOUR
SURFICIAL WASTE DEPOSIT (SEE NOTE 2)
EXISTING CAP
SILT FENCE REQUIRED FOR PHASE I
GRADEFILL OPERATIONS
NOTES:
1. HORIZONTAL COORDINATES ARE MODIFIED STATE PLANE COORDINATES COLORADO CENTRAL ZONE BASED ON NAD83 WITH A DATUM ADJUSTMENT FACTOR OF 1.00026853 ELEVATIONS SHOWN ARE MEAN SEA LEVEL NAVD88 CONTROL BY MONTGOMERY-PHILLIPS, INC.
DATE OF PHOTOGRAPHY: DECEMBER 14, 1994
PHOTO SCALE: 1:3600'
2. AREA TO BE EXCAVATED TO LIMIT OF WASTE ENCOUNTERED AND REGRADED FOR POSITIVE DRAINAGE.
3. EXISTING CAP WILL BE ENHANCED AS PART OF THE CAP INSTALLATION WORKPLAN.
4. GRADE/FILL AREA TO RECEIVE LANDFILL WASTE. THE AREAS WILL BE GRADED FOR CAP TIE-IN TO THE EXISTING CHANNELS AND WILL BE RECOMPACTED.
5. GRADEFILL ACTIVITIES FOR THE SOUTHERN AND NORTHERN CAP AREAS WILL BE INCLUDED IN THE CAP INSTALLATION WORKPLAN.
6. SILT FENCE TO BE LOCATED DOWNGRADIENT FROM GRADEFILL ACTIVITIES AS SHOWN. ADDITIONAL AREAS ON HILL TOP WASTE AREA MAY REQUIRE EROSION CONTROL.
N
SCALE: 1 INCH = 200 FEET
100 0 100
$$ – THINK VALUE ENGINEERING – $$
Revisions
Symbol | Descriptions | Date | Approved
RUST ENVIRONMENT & INFRASTRUCTURE
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA
Designed by: MF
Drawn by: MF
Checked by: MY
Reviewed by: JE
Submitted by:
FIGURE 4-4
PHASE I
WASTE RELOCATION / EROSION CONTROL PLAN
LANDFILL No.2 (FTC-006)
Plot Scale Ratio: SHOWN
Date: DECEMBER 1997
Design File: LF2GF98A.DGN
Spec. No.:
Drawing Code:
Contract No.: DACW 45
Sheet reference number:
COMPUTER AIDED DESIGN & DRAFTING
CAD FILE: L:\WORK\29188\CAD\FTCARSON\LF2\LANDFL2\LF2GF98A.DGN

Description	Orig Dur	Rem Dur	Early Start	Early Finish
Landfill 2 Construction				
Develop Mobilization Plan	8	8	10DEC97	19DEC97
USACE/Ft. Carson Approval of Mobilization Plan	5	5	22DEC97	29DEC97
Install Soil Vapor Probes	5	5	12JAN98 *	16JAN98
Setup Temp. Facilities/Utilities	2	2	05JAN98 *	06JAN98
Mobilize Equipment/Facilities	2	2	07JAN98	08JAN98
Clear and Grub	3	3	09JAN98	13JAN98
Precompact Fill Areas	3	3	14JAN98	16JAN98
Gradefill Soil/Waste	35	35	19JAN98	06MAR98
Install Evapotranspiration Cap	25	25	09MAR98	10APR98
Enhance Existing Cap	30	30	09MAR98	17APR98
Seeding/Revegetation	15	15	20APR98	08MAY98



Early bar
Progress bar
Critical bar
Summary bar
Progress point
Critical point
Summary point
Start milestone point
Finish milestone point

Data date	10DEC97
Run date	10DEC97
Number/Version	1
Page number	3A
Page count	3B

Figure 5-1
Landfill 2 Project Schedule
Gradefill and Estimated Cap Construction Activities

Date	Revision	Checked	Approved
02JUN97	Sequencing/Edits	JAE	JAE

APPENDIX A

SITE-SPECIFIC SAFETY AND HEALTH PLAN
LANDFILL 2 GRADEFILL

SITE-SPECIFIC SAFETY AND HEALTH PLAN
LANDFILL 2 GRADEFILL
FORT CARSON, COLORADO

Prepared for:
U.S. Army Corps of Engineers
Omaha District

Prepared by:
Rust Environment & Infrastructure
Englewood, Colorado

Project No. 55253.000 WBS 743

January 1998

SITE-SPECIFIC SAFETY AND HEALTH PLAN
LANDFILL 2 GRADEFILL
FORT CARSON, COLORADO

Rust Environment & Infrastructure
5575 DTC Parkway, Suite 200
Englewood, Colorado 80111

Prepared by:

Wendy Johnson, CIH, CSP
Project Safety and Health Manager

Donna Fabyanic
Project Coordinator

Reviewed by:

John England, P.E.
Project Manager

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LIST OF ATTACHMENTS

Attachment	Title
1	Confined Space Entry Permit

LIST OF ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
CFR	Code of Federal Regulations
dBA	Decibel (A-weighted)
EOD	Explosive Ordnance Detail
IDLH	Immediately Dangerous to Life or Health
MSDS	Material Safety Data Sheet
NIOSH	National Institute of Occupational Health
OE	Ordnance and Explosives
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
ROPS	Rollover Protective Structures
Rust	Rust Environment & Infrastructure
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
USACE	U.S. Corps of Engineers
UXO	Unexploded Ordnance
WBGT	Wet Bulb Globe Temperature Index

A1.0 INTRODUCTION

The following Site Specific Safety and Health Plan (SSHP) is intended as an addendum to the Programmatic SSHP developed for project work completed at Fort Carson, Colorado. This SSHP contains information specific to the gradefill activities at Landfill 2.

This SSHP has been prepared in conformance with U.S. Army Corps of Engineers (USACE) Safety and Health Requirements Manual EM 385-1-1, Occupational Safety and Health Administration (OSHA) Title 29 Code of Federal Regulations (CFR) 1910.120 - Hazardous Waste Site Operations and Emergency Response, 29 CFR 1910.1200 - Hazard Communication, 29 CFR 1910.134 - Respiratory Protection, and 29 CFR 1926 - Construction. Compliance with this SSHP is required of all Rust Environment & Infrastructure (Rust) Team personnel who are involved on the Landfill 2 Gradefill.

A2.0 SITE DESCRIPTION

A2.1 LANDFILL 2

The former Landfill 2 is located east of the Cantonment Area, SE 1/4, Section 15, T15S, R66W. The site reportedly covered over 98 acres, and was reportedly operated between 1960 and 1978 as a combined trench and fill landfill. It is reported that the types of waste received at the site include mixed sanitary waste, waste petroleum, oil, and lubricants.

A3.0 SCOPE OF WORK

The scope of work for the Landfill 2 Project is described in the Work Plan and will progress through the following phases:

- Mobilization/Site Preparation - The project workforce will mobilize to Landfill 2 to commence with the initial installation phase.
- Gradefill - Existing waste will be relocated and placed along with soil as gradefill to bring the cap areas to the design grades. Equipment used during gradefill activities will be decontaminated as discussed in the Work Plan, and soil samples may be collected for waste determination if hazardous materials are encountered during gradefill activities.
- Borrow Soil Sampling - Soil samples from potential borrow areas will be collected and analyzed for chemical and geotechnical properties.
- Vapor Probe Installation - Soil vapor monitoring probes will be installed between the edge of the landfills and surrounding buildings.

A4.0 PROJECT PERSONNEL

The following is a list of the key project personnel, organizations, and telephone numbers.

Name	Title	Organization	Telephone Number
John Shaler	Program Manager	Rust	303/694-6660
Mark Scott, P.E.	Chief Project Manager	Rust	719/471-7070
John England, P.E.	Project Manager	Rust	303/694-6660
Wendy Johnson, CIH, CSP	Project Safety and Health Manager	Rust	303/694-6660
Mark Yaskanin, P.E.	Project Engineer	Rust	303/694-6660
Scott Olson	Task Manager	Rust	303/694-6660
Jim Henderson	Remedial Program Manager	Fort Carson	719/526-8001
Martin Rasmussen	Government Quality Assurance Manager	USACE	719/526-5906
Onsite Personnel			
Bob Hulet	Construction Manager	OHM	719/540-5933
Jason Haugh	Health and Safety Coordinator	OHM	719/540-5933
Rick Jennings	Construction Quality Assurance Manager	Rust	719/527-0121
Vien Perez	Quality Control Systems Manager	OHM	719/540/5933

A5.0 HAZARD OVERVIEW

The primary health and safety hazards to be encountered during Landfill 2 Gradefill include:

- Chemical Hazards;
- Physical Hazards;
- Biological Hazards; and
- Ergonomic Hazards.

Several hazards may be encountered during the course of each task. Anticipated hazards are addressed in the following sections. Some of these hazards and their respective safety controls are detailed in the Programmatic SSHP.

A5.1 CHEMICAL HAZARDS

The types of waste reportedly received at Landfill 2 include mixed sanitary waste, petroleum, oil, and lubricants. Table A-1 presents compounds of concern that may be present during landfill activities based on groundwater sampling at Landfill 2 and other landfills at Fort Carson.

During consolidation activities, potential contact with waste materials will be avoided. If contact is necessary, sampling and decontamination will be performed in accordance with procedures for gradefill activities. Air monitoring in the immediate vicinity of the excavation will be used to evaluate upgrades of personal protective equipment (PPE). Air monitoring procedures and PPE requirements are discussed in detail in Sections A8.0 and A4.0, respectively.

Material Safety Data Sheets (MSDSs) for any chemicals used onsite will be obtained prior to or upon their delivery at Fort Carson. Each MSDS will be reviewed by the Site Safety and Health Officer (SSHO) and modifications to SSHP procedures will be made. The information provided by the MSDS will be reviewed with those affected employees, prior to the chemicals use, during periodic safety briefings.

A5.2 PHYSICAL HAZARDS

Physical hazards associated with construction activities associated with this project are typical of construction projects. These hazards include:

- Slips, trips, and falls from uneven work surfaces in the work area;
- Confined space work during the vault extension work;
- Hazardous energy and sources in the form of electricity, rotating parts, mechanical equipment, and hydraulic pressure;
- Heavy equipment hazards from drill rigs, backhoes, front end loaders, and compactors;
- Electrical from the use of electrical powered equipment;
- Noise from heavy equipment, drill rigs, jack hammers, and cutting, etc.; and
- Hand-held equipment such as saws, etc.

Other physical hazards include temperature stress and illumination-related hazards when working in low level daylight hours outside. Each of the above mentioned hazards and appropriate control methods are discussed in the Programmatic SSHP.

A5.2.1 General System Hazards

Physical processes associated with this task will involve mechanical equipment such as power tools and motors. Where moving parts are exposed, employees must be cognizant of their location and shall avoid inadvertent placement of appendages, clothing, or equipment where they could enter the machinery. This also may include hazards related to the operation of motor vehicles and heavy equipment. These hazards are not unique and are generally familiar to most workers on a hazardous waste site.

Additional unforeseen hazards may arise once work begins and as site conditions change. Potential hazards will be analyzed on a task-specific basis by the Rust SSHO and the Rust Project Safety and Health Manager as necessary.

A5.2.2 Slip, Trip, and Fall Hazards

Slip, trip, and fall hazards are expected to be a major hazard encountered during site activities. Common surface falls can be divided into the following four categories:

- Trip and fall accidents occur when a worker encountered an unseen foreign object in their path. When a foot strikes the object, the employee trips and falls.

- Step and fall accidents occur when a worker's foot suddenly meets a sticky surface or a defect in the walking surface. Expecting to continue at the established pace, the worker falls when his or her foot is unable to respond properly.

- Step and fall accidents occur when the foot encounters an unexpected step down. This can also happen when an employee thinks he or she has reached the bottom of the stairs when, in reality, there is one more step.

- Slip and fall accidents occur when the worker's center of gravity is suddenly thrown out of balance.

Rust plans to use the following strategies to help prevent slip, trip, and fall hazards:

- Practice good housekeeping. All working areas will be kept as clean and dry as possible.

- Require nonskid footwear. All employees will be required to wear footwear with nonskid soles.

- Inspect surfaces on, at a minimum, a daily basis. One person on each crew will be required to conduct daily inspections of the work area and act immediately when a hazard is identified. In addition, all personnel will immediately notify their supervisor or the SSHO whenever a slip, trip, or fall hazard occurs.

A5.2.3 Confined Spaces

Confined spaces present their own special hazard in any work place setting. These spaces include manholes, vaults, tanks and pits. No Rust or subcontractor personnel will be allowed to enter any confined space without special provisions (Programmatic SSHP, Section 7.4.1). A confined space entry permit and associated forms and tags (Appendix I of the Programmatic SSHP) must be used before entry is allowed into a space. In addition, a 20-foot extension will be used on the multimeter to ensure that all levels of the vault are monitored prior to entry. All procedures will be in compliance with OSHA's Standard for Confined Spaces, 29 CFR 1910.146 and Rust's Technical Standard T.00.023.

A5.2.4 Control of Hazardous Energy (Lockout/Tagout)

During the course of the Landfill 2 Gradefill, employees may be exposed to hazardous energy sources including energized electrical lines. Release of this electrical energy could lead to serious physical

harm to employees. Thus, prior to working around these sources, the systems will be isolated in accordance with the procedures presented below and in full compliance with EM 385-1-1 and OSHA 29 CFR 1910.147.

For all activities involving hazardous energy sources, the following general procedures will be followed, along with the procedures detailing the Hazardous Energy Control Plan furnished by the contractor performing the work. The SSHO will ensure the contractor has a hazardous energy control plan which is in compliance with EM 385-1-1.

- The SSHO or designee will coordinate, approve, and be present for all activities requiring lockout/tagout.
- The SSHO, Construction Manager, and contractor will conduct an inspection of the worksite to ensure all hazardous energy sources are identified and their main source switch located.
- The SSHO or designee will notify those employees involved in the activity and those individuals who may potentially enter the location of the main energy isolating device and/or the location where activities will take place.
- The SSHO or designee will place a suitable locking device on the main energy isolation device to isolate the energy after a qualified, knowledgeable person (i.e., person with thorough knowledge of the system being controlled including its operation, its associated hazards, and its control) turns off the energy source. If there is no way to place a locking device on the isolating device, a tag will be placed with employees given clear instruction as to its purpose.
- A suitable locking device is one which is capable of withstanding the environment in which it is being used, for the duration of its use. In addition, the locking device will have a means of indicating who applied it. It will be substantial enough and operate in a way as to eliminate the possibility of unauthorized, or inadvertent removal without the use of excessive force or unusual techniques (i.e., bolt cutters).
- All employees involved in the activity will be briefed on the lockout/tagout requirements as a review of the discussion provided in the site-specific training.
- Following placement of the locking device or tag, the system will be tested by a qualified individual to ensure that the system has been de-energized.
- If the activity is stopped prior to its completion for breaks, lunch, end of day, etc., the SSHO will inspect the site and the lockout/tagout devices prior to leaving the site. In addition, prior to proceeding with the activity after the work stoppage, the SSHO will once again inspect the site

and the lockout/tagout devices to ensure all is safe to resume. These inspections will be documented by the SSHO.

- Prior to removing lockout/tagout devices, the SSHO will inspect the area to ensure all items are in order, all employees notified, and safety positioned, and all system components operationally intact.

- Only the SSHO who placed the locking device will be authorized to remove it. The SSHO will remove the device, and energy restored to the system.

A5.2.5 Electrical Shock Prevention

Various pumps and other machinery are operated by electrical current. All electrical equipment will be properly grounded. The use of ground-fault circuit interrupters or equivalent for hand tools is necessary to eliminate the potential for electric shock. All equipment must be approved for the class of hazard as listed in OSHA standards for electrical power (29 CFR 1926, Subpart K).

A5.2.6 Electrical Safety

Extension cords shall be the three-wire type for grounded tools (two-wire is permissible for double-insulated tools) and shall be protected from damage. Electrical cords shall not be fastened with staples or extended across aisles or walkways. Worn or frayed cords shall not be used and will be cut to prevent inadvertent use. Cords shall not be run through doorways where the door could cut or damage them.

Exposed bulbs on temporary lights shall be guarded to prevent accidental contact, except where bulbs are deeply recessed in the reflector. Temporary lights shall not be suspended by their electric cords unless specifically designed for this use. Explosion-proof bulb covers shall be used when contact with flammable vapors or gases is possible and shall met Class I, Division I, requirements.

Receptacles for attachment plugs shall be of the approved, concealed, contact type. Where different voltages, frequencies, or types of current are supplied, receptacles shall be of such design that attachment plugs are not interchangeable.

Electrical tools and appliances used in wet environments shall require ground fault interrupters and water-tight connectors.

A5.2.7 Crush Potential

A crushing hazard exists when a part of the body may be caught between two hard surfaces which progressively move together. Generally, there are three categories for crushing hazards: squeeze points; run-in points; and impact hazards.

Squeeze-point hazards exist where two hard surfaces, at least one of which must be in motion, push close enough together to crush an object that may be located between them.

Run-in point hazards exist where two objects, at least one of which is rotating, move progressively close together. The gap between the objects need not become completely close but only be smaller than the body part lodged in it.

Impact hazards are accidents that involve acceleration and impact. Examples of impact hazards are a heavy object falling on a foot or a hammer hitting a finger.

The following general safeguards will be used to prevent injuries from crushing actions:

- All self-propelled construction and industrial equipment will be equipped with operating back-up alarms;
- All belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, and other moving parts will be guarded where those parts may be contacted by persons or create a hazard;
- Guards shall be left in place except when their removal is necessary for maintenance and only after the equipment has been appropriately locked-out or otherwise protected from starting;
- Appropriate PPE will be worn (i.e., hardhats, steel toed shoes/boots) as necessary to protect against crushing hazards;
- Only personnel trained in the operation of the necessary equipment will operate it;
- All overhead items will be properly secured;

- Mechanized equipment will be utilized where possible or assistance from one or more persons will be utilized when lifting or moving objects that could pose a crush hazard; and

- Personnel shall keep hands and other body parts away from moving objects and always be on guard for moving objects and vehicles.

The following guidelines will be used when establishing safeguards during site activities to ensure that the safeguard:

- Prevents contact with the hazard;
- Is secure and durable;
- Protects against falling objects;
- Creates no new hazard;
- Does not interfere with work that needs to be performed; and
- Allows for safe maintenance.

A5.2.8 Noise Hazards

Noise is a potential hazard associated with the operation of heavy equipment, pumps, generators, jack hammers, and power tools. Engineering and administrative controls will be implemented at 85 decibels (A-weighted) (dBA) when possible to reduce noise levels in the work zones. Noise hazard areas will be marked with caution signs indicating the presence of hazardous noise levels and the requirements for hearing protection.

A5.2.9 Underground/Overhead Utilities

Rust will coordinate with Fort Carson to identify the locations of all underground utilities prior to any excavation. Damage to underground utilities during site activities could lead to electric shock, explosion, and serious injury. Before beginning work, the SSHO will verify and inspect work procedures and equipment and the location of overhead lines to ensure that no portion of an individual or equipment is brought within the safe minimum clearance detailed in Table 5-1 of the Programmatic SSHP. Whenever possible, all circuits adjacent to the planned activity shall be de-energized by Fort Carson. Fort Carson will then provide the SSHO with written verification of the de-energization and circuit lock-out. At no point should work begin without this verification. If de-energizing of the circuit is not possible or practical, the minimum safe clearance detailed in Table 5-1 of the Programmatic SSHP will be maintained for all operations. If de-energizing is possible, work

will not start until power has been disabled and an effort has been made to de-energize the lines and Fort Carson verification has been received.

A5.2.10 Heat Stress

Heat stress may be a hazard if the landfill gradefill work is performed during summer months. Heat stress is caused by external heat sources such as high ambient air temperature and direct sunlight, or internal body heat build-up resulting from heavy work or prolonged use of protective gear. Heat stress may manifest itself as heat cramps, heat exhaustion, and heat stroke. See the Programmatic SSHP for a further discussion of heat stress.

The SSHO will establish a work/rest schedule, as recommended by the American Conference of Governmental Industrial Hygienists (ACGIH), on a daily basis depending on weather conditions and site activities. Rest should be sought in the shade. Table A-2a will be used as a guide for establishing a work/rest regimen when workers are required to wear a basic work uniform. Wet Bulb Globe Temperature Index (WBGT) values will be corrected when workers are in any level of protection by subtracting 6 from each value. While it is anticipated that respiratory protection will be the only additional personal protection device required over and above the standard construction wear, Table A-2b will be used as a guide for establishing a work/rest regimen when workers are required to wear any level of protection (including a respirator).

A5.2.11 Cold Stress

Cold stress conditions may exist if landfill gradefill work is performed during the winter months. Cold stress, including frostbite and hypothermia, can result in severe health effects. Bare flesh and areas with high surface area to body volume ratios are highly susceptible to wind chill or low temperatures. The Programmatic SSHP has a detailed discussion of cold stress.

Monitoring for cold stress is difficult and will be accomplished by the SSHO by monitoring for symptoms of frostbite and hypothermia and monitoring the weather conditions on a daily basis. In addition, project team personnel will be equipped with adequate cold protective clothing. The SSHO

will also establish regimes for adequate warming as recommended by the ACGIH. Table A-3 will be used as a guideline for establishing a work/rest regimen.

A5.2.12 Illumination Requirements

A portion of the landfill project work may be conducted during low light level periods in the mornings and evenings. Each area must have adequate lighting for personnel to safely perform work activities and identify potential hazards. While work activities are in progress, access ways and site work areas will be lighted to at least the minimum light intensities specified in Minimum Lighting Requirements of EM 385.1-1 (Table A-4).

A5.2.13 Hand and Power Tools

Hand and power tools may be utilized on the Landfill 2 Gradefill. The following is a list of safety tips and recommendations for the safe use of hand and power tools:

- Power tools shall be of a manufacturer listed by a nationally recognized testing laboratory for the specific application for which they are to be used.
- Hand and power tools shall be used, inspected, and maintained in accordance with the manufacturer's instructions and recommendations and shall be used only for the purpose for which designed. A copy of the manufacturer's instructions and recommendations shall be maintained with the tools.
- Hand and power tools shall be inspected, tested, and determined to be in safe operating condition prior to use. Continued periodic inspections shall be made to assure safe operating condition and proper maintenance.
- Hand and power tools shall be in good repair and with all required safety devices installed and properly adjusted. Tools having defects that will impair their strength or render them unsafe shall be removed from service.
- Power tools designed to accommodate guards shall be equipped with such guards when in use.
- When work is being performed overhead, tools not in use shall be secured or placed in holders.
- Throwing tools or materials from one location to another or from one person to another, or dropping them to lower levels, shall not be permitted.
- Only nonsparking tools shall be used in locations where sources of ignition may cause a fire or explosion.

A5.2.14 Heavy Equipment Safety

Heavy equipment can represent a substantial hazard to workers. In general, the requirements for motor vehicles and material handling equipment provided in the OSHA Construction Industry Standard 29 CFR 1926, Subpart O and applicable sections of EM 385-1-1 will be adhered to:

- Use common sense. Workers will not assume that the equipment operator is keeping track of their whereabouts. Never walk directly in back of or to the side of, heavy equipment without the operator's knowledge.
- Hard hats, steel toe boots, and safety glasses are to be worn at all times around heavy equipment. Other protective gear as specified in this health and safety plan is also applicable.
- Remain alert at all times.
- Maintain visual contact at all times.
- Establish hand signal communication when verbal communication is difficult. Identify one person per work group to give hand signals to equipment operators.
- Be aware of footing at all times.
- Only qualified/licensed people are to operate heavy equipment.
- Use chains, hoists, straps, and any other equipment to safely aid in moving heavy materials.
- Use proper personal lifting techniques.
- Equipment will not be used by individuals who are not familiar with its operation. This applies to heavy and light equipment (e.g., chain saws).
- Be sure that no underground or overhead power lines, sewer lines, gas lines, or telephone lines will present a hazard in the work area.
- Keep all non-essential people out of the work area.
- Prohibit loose-fitting clothing or loose long hair around moving machinery.
- Keep vehicle cabs free of all non-essential items and secure all loose items.
- Instruct equipment operators to report to their supervisor(s) any abnormalities such as equipment failure, oozing liquids, unusual odors, etc.

- When an equipment operator must negotiate in tight quarters, provide a second person to ensure adequate clearance.

- Implement an ongoing maintenance program for all tools and equipment. Inspect all tools and moving equipment regularly to ensure that parts are secured and intact with no evidence of cracks or areas of weakness, that the equipment turns smoothly with no evidence of wobble, and that it is operating according to manufacturer's specifications. Promptly repair or replace any defective items. Keep maintenance and repair logs.

- Store tools in clean, secure areas so that they will not be damaged, lost or stolen.

- Keep all heavy equipment that is used in the exclusion zone in that zone until the job is done. Completely clean such equipment within the designated vehicle decontamination area.

- Parking brakes will be engaged when equipment is not in use.

- All vehicles with rollover protective structures (ROPS) will have seat belts, operators will be trained in the use of seat belts, and the seat belts will be used at all times during vehicle operation.

- With certain exceptions provided in 29 CFR 1926, Subpart O, all material handling equipment will be provided with ROPS.

- Equipment with an obstructed rear view must have an audible alarm that sounds when it is operating in the reverse direction (unless a spotter guides the vehicle operator).

- Material handling equipment that lacks ROPS must not be operated on a grade, unless the grade can safely accommodate the equipment involved.

- A safety barrier will be used to protect workers whenever a tire is inflated, removed, or installed on split rims.

- Heavy equipment will be inspected by the operator prior to the beginning of each work shift, and the SSHO will ensure the compliance to this regulation.

- All implements shall be completely lowered when equipment is not in use.

- Buckets or other implements shall not be used to lift or transport personnel.

- Unauthorized personnel shall be prohibited from riding on heavy equipment or forklifts unless provided with a safe place to ride.

- Employees shall not position themselves between a fixed object and heavy equipment.

- Operators will ascend and descend heavy equipment facing the machine and maintaining three points of contact at all times.
- Operators will not jump from heavy equipment.

A5.2.15 Trenching and Excavations Protocols

Trenching and excavation activities will be conducted during the Landfill 2 Gradefill and will be in accordance with USACE EM 385-1-1 Section 25, and OSHA 29 CFR 1926 Subpart P. Entry into the trenches will be forbidden, and all materials in the trenches will be removed with the bucket and brought to the surface for examination and identification.

Prior to opening an excavation, underground installations (e.g., sewer, telephone, water, fuel, electric lines) will be located and protected from damage or displacement. Fort Carson shall be responsible for locating and marking the locations.

Specific methods of compliance are discussed in the following paragraphs.

Excavation Inspection and Testing

Excavations, the adjacent areas, and protective systems will be inspected daily, as needed throughout work shifts, and after every rainstorm or other hazard-increasing occurrence by a competent person. If evidence of a situation which could result in possible cave-ins, slides, failure of protective systems, hazardous atmospheres, or other hazardous conditions are identified, exposed workers shall be removed from the hazard and all work in the excavation stopped until all necessary safety precautions have been implemented.

In locations where oxygen deficiency or gaseous conditions are known or suspected, air in the excavation shall be tested prior to the start of each shift or more often if directed by the designated authority. A log of all test results shall be maintained at the work site.

Protective Systems

Protective systems for control measures shall include the following:

- The sides of all excavations in which employees are exposed to danger from moving ground shall be guarded by a support system, sloping or benching of the ground, or other equivalent means.
- Excavations less than 5 feet in depth which are examined by a competent person determined to have no potential for cave-ins, will not require protective systems.
- Sloping or benching of the ground shall be conducted in accordance with Section 25.C of EM 385-1-1.
- Support systems shall be in accordance with Section 25.D of EM 385-1-1.
- Protective systems shall have the capacity to resist, without failure, all loads that are intended or could reasonably be expected to be applied to the system.

Stability of Adjacent Structures

Except in stable rock, excavations below the level of the base of footing of any foundation or retaining wall shall not be permitted unless:

- A support system, such as underpinning, is provided to ensure the stability of the structure and to protect employees involved in the excavation work or in the vicinity thereof; or
- A registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation and that the excavation will not pose a hazard to employees.

If the stability of adjoining buildings or walls is endangered by excavations, shoring, bracing, or underpinning shall be provided to ensure the stability of the structure and to protect employees. The shoring, bracing, or underpinning shall be designed by a qualified individual.

Sidewalks, pavements, and related structures shall not be undermined unless a support system is provided to protect employees and the sidewalk, pavement, or related structure.

Excavation Undercut

Where it is necessary to undercut the side of an excavation, overhanging material shall be safely supported.

Protection from Water

Diversion ditches, dikes, or other means shall be used to prevent surface water from entering an excavation and to provide good drainage of the area adjacent to the excavation.

Employees shall not work in excavations in which there is accumulated water or in which water is accumulating unless the water hazards posed by accumulation are controlled. Freezing, pumping, drainage, and similar control measures shall be planned and directed by a competent engineer. Consideration shall be given to the existing moisture balances in surrounding soils and the affects on foundations and structures if it is disturbed. When continuous operation of groundwater control equipment is necessary, an emergency power source shall be provided. Water control equipment and operations shall be monitored by a competent person to ensure proper operation.

Protection from Falling Material

Employees shall be protected (by scaling, ice removal, benching, barricading, rock bolting, wire mesh, or other means) from loose rock or soil which could create a hazard by falling from the excavation wall. Special attention shall be given to slopes which may be adversely affected by weather, moisture content, or vibration. Materials, such as boulders or stumps, that may slide or roll into the excavation shall be removed or made safe.

Excavated material shall be placed at least 2 feet from the edge of an excavation or shall be retained by devices which are sufficient to prevent the materials from falling into the excavation. In any case, material shall be placed at a distance to prevent excessive loading on the face of the excavation.

Mobile Equipment and Motor Vehicle Precautions

When vehicles or mobile equipment are utilized or allowed adjacent to an excavation, substantial stop logs or barricades shall be installed. The use of a ground guide is recommended. Workers shall stand away from vehicles in operation or when being loaded or unloaded to avoid being struck by spillage or falling materials.

Excavating or hoisting equipment shall not be allowed to raise, lower, or swing loads over personnel in the excavation without substantial overhead protection.

Work on Faces or Sloped Excavations

Employees shall not be permitted to work on the faces of sloped or benched excavations at levels above other employees unless employees at lower levels are adequately protected from the hazard of falling material or equipment.

A5.2.16 Fall Protection

Onsite personnel working at heights of 6 feet or greater will be protected from falls by using appropriate fall protection measures (i.e., safety harness, lanyards, safety belts).

A5.2.17 Unexploded Ordnance and Other Warfare Materials

Although historical information regarding Landfill 2 indicates that unexploded ordnance (UXO) is not present, the possibility exists that UXO and ordnance and explosives (OE) may be encountered during gradefill activities. Explosive Ordnance Detail (EOD) personnel will brief site personnel regarding the recognition of UXO and OE. In addition, the identification of UXO and OE and the required safety procedures to be followed will be discussed in the daily safety briefings to maintain awareness during gradefill activities. If UXO, OE, or shell casings are encountered during gradefill activities, the site will be evacuated and EOD personnel will be contacted through the EOD Response Line. Following the survey of the area by EOD personnel, hazards due to the presence of explosives shall be reduced by following the standards and procedures outlined in Section 5.2.5 of the Programmatic SSHP.

A5.3 BIOLOGICAL HAZARDS

Biological hazards that may be present at Landfill 2 include spiders, bees, wasps, prairie dogs, and snakes. Considerations for biological hazards may be necessary when workers are required to enter remote or seldom-visited locations. Biological hazards are detailed in Section 5.3 of the Programmatic SSHP.

Spiders, bees, and wasps can be considerable hazard for those people with known allergic reactions to the venom. The SSHO should be notified if any worker is sensitive to these biological hazards.

Ticks may also be a hazard at Landfill 2. Tick-borne disease is generally caused by a bacterium which may be transmitted by the bite of a tick. When an infected tick bites, the bacterium is passed in the bloodstream of the host. The various stages and symptoms of the disease are well recognized and, if detected early, can be treated with antibiotics.

When in an area suspected of harboring ticks, the following precautions can minimize the chances of being bitten by a tick:

- Wear long pants and long-sleeved shirts that fit tightly at the ankles and wrists;
- Wear light-colored clothing so ticks can be easily spotted;
- Use tick repellents;
- Inspect clothing frequently while in tick habitat; and
- Inspect head and body thoroughly when returning from the field.

Removal of ticks is best accomplished using small tweezers. Do not squeeze the tick's body. Grasp it where the mouth parts enter the skin and tug gently, but not firmly, until it releases its hold on the skin. Save the tick in a jar labeled with the date, body location of the bite, and the place where it may have been acquired. Wipe the bite thoroughly with an antiseptic and seek medical attention as soon as possible.

Bloodborne pathogens may also be a concern at Fort Carson. There is potential for worker injury during site-specific tasks, resulting in possible worker exposure to bloodborne pathogens (i.e., hepatitis B virus and human immunodeficiency virus). To avoid occupational exposure, workers will be trained according to 29 CFR 1910.1030 (Occupational Exposure to Bloodborne Pathogens). More detail on Bloodborne Pathogen Exposure control is provided in the Programmatic SSHP.

A5.4 ERGONOMIC HAZARDS

Ergonomics is the science of fitting people and their work tasks comfortably together. Employees should be aware of ergonomic controls that reduce on-the-job stress and strain. The following issues will be addressed to assess the ergonomic hazards during site activities:

- Are tasks being performed that involve unnatural or hazardous movements?
- Are tasks being performed that involve frequent manual lifting?
- Are tasks being performed that involve excessive wasted motion?
- Are tasks being performed that involve unnatural or uncomfortable postures?
- Are tasks being performed that should be automated?

Each task will be evaluated based on these questions, and controls will be implemented as is practical and feasible.

A6.0 EXPOSURE MONITORING

The monitoring of the environment at Landfill 2 will be necessary to ensure that proposed levels of protection and procedures are adequate to ensure the health and safety of personnel onsite. Monitoring of the environment will include ambient air monitoring and heat/cold stress monitoring. The information gained will be used to adjust levels of protection and work/rest regimens.

A6.1 EQUIPMENT AND INSTRUMENTATION

The procedures for the operation and maintenance of real time direct reading air monitoring instruments and personal sampling equipment for industrial hygiene parameters will be available onsite.

A6.2 MONITORING STRATEGY

Air monitoring shall be conducted to identify any immediately dangerous to life or health (IDLH) conditions and exposures over published exposure levels. See Table A-5 for monitoring requirements. The air monitoring results will be used as part of the waste determination activities.

A6.3 REAL-TIME MONITORING

Real-time monitoring will be conducted during all invasive activities. See Table A-6 for real-time monitoring action levels. Additional monitoring will be required at the discretion of the SSHO.

A6.4 INITIAL CHARACTERIZATION MONITORING

The SSHO will conduct initial monitoring to characterize the exposures for each work activity. Initial characterization monitoring will be conducted on those workers who represent the highest exposure potential for that job classification. The number of workers included in the air monitoring program will be expanded from only high-risk workers when exposures are suspected of exceeding action limits.

A6.5 NOISE MONITORING

The SSHO will perform a general sound level survey of all tasks. Noise dosimetry will be conducted on those workers who represent the highest exposure potential.

A6.6 CALIBRATION/MAINTENANCE

All instruments (both real-time and personal sampling equipment) will be calibrated according to the manufacturer's recommendations. All equipment will be calibrated before and after use. A calibration log will be kept to record all calibrations. Real-time instrument results will be recorded in the daily safety log books used by each health and safety officer.

A6.7 METHODS

Integrated samples will be collected, at the discretion of the SSHO, using National Institute of Occupational Health (NIOSH) methods or OSHA methods. Sampling flow rates will be in accordance with method requirements in order to assess adequacy of PPE and potential exposure of contaminants to employees. Samples will be analyzed by an American Industrial Hygiene Association (AIHA) accredited laboratory.

A6.8 EXPOSURE RECORDS

The SSHO will forward all personnel exposure records to the Rust Division Health and Safety Officer. Report of exposure will be provided, upon written request, to the individual within 15 days upon receipt of the results.

A6.9 CONFINED SPACE MONITORING

Atmospheric monitoring during activities with designated confined spaces will be conducted in accordance with the Programmatic SSHP and Tables A-5 and A-6. A confined space entry permit will be obtained as required in the Programmatic SSHP (see Attachment A).

A7.0 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

PPE will be used to reduce or eliminate chemical and physical hazards that may be encountered during field activities. Personnel shall wear protective equipment when field operations involve known or suspected hazards associated with activities at Landfill 2. Based on the hazards associated with specific activities, and air monitoring results, the SSHO will make the final determination. Where appropriate, PPE worn shall meet American National Standards Institute (ANSI) requirements. The level of protection for each activity associated with Landfill 2 tasks are included in Section A8.0.

The general ensemble components required to provide Level D, Level C, and Level B protection are listed in Tables A-7 through A-9. Most activities are anticipated to require Level D or modified Level D protection. Level C and Level B are not anticipated to be necessary.

A8.0 ACTIVITY HAZARD ANALYSIS

The hazards of each major phase of Landfill 2 work are identified below. Detailed descriptions of the activities associated with each phase are presented in Section A3.0. Procedures to control the hazards associated with each phase are detailed in Sections A5.0 through A7.0 of this SSHP. These analyses are general in nature and do not serve as a substitute for formal hazard analyses which will be performed by the contractors prior to initiating each task. The forms, presented in Figure 7-1 of the Programmatic SSHP, will be completed by the contractor and reviewed with affected personnel as part of required safety briefings.

Only chemical and physical hazards are presented here as ergonomic and biological hazards as described in Section A5.0 are the same for all phases. Where two levels of protection are provided, the lower of the two will be the initial level of protection as the higher level is listed only as a possible requirement. However, it is not anticipated or expected that the higher level would be required except in the event of an extreme situation. Monitoring will be conducted to ensure the appropriate level of protection is being worn by site personnel during each task.

A8.1 MOBILIZATION AND SITE PREPARATION

- Chemical Hazards: None anticipated;
- Physical Hazards: Heavy equipment, noise, temperature stress; and
- Level of Protection: Level D.

A8.2 GRADEFILL

- Chemical Hazards: Waste petroleum, oil, and lubricants, landfill gases, hydrogen sulfide, contaminated groundwater and soil;
- Physical Hazards: Heavy equipment; slip, trip, falls; vibration; crushing; power tools, electrical, noise, temperature stress; and
- Level of Protection: Modified Level D.

A8.3 BORROW AREA SAMPLING

- Chemical Hazards: None anticipated because borrow areas located outside of site;
- Physical Hazards: Heavy equipment; slip, trip, falls; vibration; crushing; power tools, electrical, noise, temperature stress; and
- Level of Protection: Level D.

A8.4 VAPOR PROBE INSTALLATION

- Chemical Hazards: Landfill gases, hydrogen sulfide, contaminated groundwater and soil;
- Physical Hazards: Heavy equipment; slip, trip, falls; vibration; crushing; power tools, electrical, noise, temperature stress; and
- Level of Protection: Modified Level D.

A9.0 SITE CONTROL AND DECONTAMINATION

A9.1 SITE CONTROL

Site control will be accomplished with existing construction site control measures. Work zones will be established around activities which create hazards but will be immediately removed when the hazard ceases.

A9.2 DECONTAMINATION

All equipment will be high pressure hot water washed until visibly clean, and major pieces of equipment will be wipe sampled to confirm the effectiveness of the pressure washing. If a surface is not accessible, then it will be deemed contaminated. Emergency equipment will remain in service (i.e., safety shower and eyewash) in the event emergency decontamination is required.

A10.0 EMERGENCY RESPONSE PLAN

See Programmatic SSHP for details of the Emergency Response Plan.

HOSPITAL:	Penrose Hospital 2215 N. Cascade Avenue Colorado Springs, CO 80907 719/630-5000
Directions to Offsite Medical Facility:	From Fort Carson take Highway 115 (South Nevada Avenue). Proceed North 6.5 miles to Jackson Street. Proceed West on Jackson one block to Emergency Room Entrance.
FIRE/RESCUE:	9-911
AMBULANCE:	9-911
Fort Carson Security:	719/526-2333; If on post, dial 2123
Fort Carson Health and Safety Office:	Building 1818 719/526-7000
Fort Carson Environmental Coordinator:	Jim Henderson 719/526-8001
EOD Response Line	719/526-2643
National Response Center:	1-800-424-8802

A11.0 SITE DOCUMENTS

A safety log book and various forms will be kept by the SSHO to document events related to safety for the Fort Carson project. General procedures that pertain to the use of all log books and log forms include recording the following on each page of the safety log books: the initials of persons making the entry; date and time of each entry (military time); a description of the activities as they are occurring; and location. Each log or form will be signed at the end of each day or work shift. All blanks on a form will be filled in with appropriate information or the words "none" or "NA" (not applicable). All entries will be made in ink. No pages will be removed from the log book.

All safety briefings and environmental and personal exposure monitoring/sampling results will be recorded in the safety log book. This log will include an outline of the topics discussed and the names of personnel attending.

A variety of records will be collected and organized prior to and during field activities, including:

- Hazard Analysis Forms;
- Training Logs;
- Employee and Visitor Log;
- Medical Information;
- Accident Report;
- Daily Inspection Logs;
- Daily Safety Log;
- Air Monitoring and Calibration Log;
- Equipment Inspection Logs; and
- Monitoring Equipment Sheets.

The Programmatic SSHP describes the following documents: medical records (Section 12.0); Accident Reports (Section 6.0); Daily Inspection Logs (Section 6.0); and Air Monitoring Records and Logs (Section 11.0). The remaining records, logs, and reports to be maintained before, during, and after the project are detailed in the following section.

A11.1 TRAINING LOGS

In addition to the training records to be kept onsite as described in Section 13.0 of this Programmatic SSHP, records will be kept for site-specific training, hazard communication, bloodborne pathogen, hearing conservation, and vision conservation, and will include the following information:

- Course participant's name, and signature;
- A copy of the course agenda; and
- The signature of the trainer and date.

A11.2 EMPLOYEES AND VISITORS LOG

All employees and visitors will be required to sign a daily log in order to document who was onsite and when. This log will be maintained by the SSHO or Project Manager and will include the following information:

- Date;
- Name of visitor or employee;
- Agency or company represented;
- Time entering the site; and
- Time exiting the site.

This log will be maintained as a section of the Daily Report.

A11.3 INSPECTION LOGS

The SSHO will maintain a daily safety log. Each page will be dated with a new day starting on a new page. An unused portion of a page will have a line placed through it and initialed. The end of the daily entry will be signed and dated by the SSHO. The daily safety log will include the following:

- Date;
- Activities to be completed that day;
- Weather information;
- Locations of site personnel;
- Equipment being used by onsite personnel;
- PPE being worn by all onsite employees and visitors;
- Air monitoring data;
- A log of activities, conversations, meetings, and telephone calls pertaining to safety, etc., including the times they occurred; and
- The SSHO's signature and date.

In addition, the SSHO will complete a detailed Weekly Safety Inspection Report to be included with all site-related logs and records.

A11.4 OSHA RECORDKEEPING

All medical and employee exposure records will be maintained per 29 CFR 1910.20. These records will be maintained for the duration of employment of each employee plus an additional 30 years.

TABLES

TABLE A-1
TOXICOLOGICAL AND PHYSICAL PROPERTIES OF COMPOUNDS OF POSSIBLE CONCERN

Compound	CAS	Hazard[b]	Volatility[c]	Skin Abs[d]	Carcinogen[e]	Exposure Limit (ppm)[f]	Comments
Polynuclear Aromatic Hydrocarbons							Formed during the incomplete combustion of organic materials. PAHs are highly lipid soluble and are readily absorbed by all routes of exposure. Several PAH compounds have been shown to cause cancer in humans or in experimental animals.
Naphthalene	91-20-3	3	Yes	Yes	Yes	10	White, crystalline solid which at room temperature volatilizes appreciably. Mothball-like odor. Can cause headache, nausea, eye irritation. Moderate fire hazard when exposed to heat or flame. Naphthalene poisoning can cause manifestation of anemia.
Phenanthrene	85-01-8	3	Yes	Yes	Yes	Not Listed	Solid crystals that are insoluble in water. Combustible when exposed to heat or flame. Reacts vigorously with oxidizing materials. Moderately toxic by ingestion. Skin photosensitizer. May cause skin cancer.
Pyrene	129-00-0	3	Yes	Yes	Yes	Not Listed	Colorless solid. Emits acrid smoke and irritating fumes when heated to decomposition. Vapors cause eye irritation, excitement, and muscle contractions. Skin and eye irritant.
Volatile Organic Compounds							
Methylene Chloride	75-09-2	3	Yes	Yes	Yes	50	Nonflammable, colorless liquid with a pleasant aromatic odor. Inhalation of vapors and direct skin contact may cause a dry scaly dermatitis. The liquid and the vapor are irritating to the eyes and upper respiratory tract at high concentrations. Labeled as a human carcinogen.
Acetone	67-64-1	3	Yes	Yes	No	750	A colorless flammable liquid with a sweetish odor. Routes of entry include inhalation, ingestion, and skin and eye contact. Effects of overexposure include irritation of the eyes, nose, and throat, headaches, dizziness, and dermatitis.
Benzene	71-43-2	3	Yes	No	Yes	1	Confirmed human carcinogen producing myeloid leukemia, Hodgkin's disease, and lymphomas by inhalation. Moderately toxic by ingestion and subcutaneous routes. Human systemic effects by inhalation and ingestion.: blood changes, increased body temperature.

TABLE A-1
TOXICOLOGICAL AND PHYSICAL PROPERTIES OF COMPOUNDS OF POSSIBLE CONCERN

Compound	CAS	Hazard[b]	Volatility[c]	Skin Abs[d]	Carcinogen[e]	Exposure Limit (ppm)[f]	Comments
Ethylbenzene	100-41-4	3	Yes	Yes	No	100	Colorless, flammable liquid with a pungent aromatic odor. Main points of attack include the eyes, upper respiratory system, skin, and the central nervous system. Symptoms of acute exposure include irritation of the eyes and mucous membranes, headaches, dermatitis, and narcosis. Chronic exposures can lead to kidney and lung disease, chronic respiratory disease and skin disease.
Hydrogen Sulfide	7783-0604	3	Yes	No	No	10	Colorless, flammable gas with an offensive odor. A human poison by inhalation. A severe irritant to eyes and mucous membranes. An asphyxiant. Human systemic effects by inhalation: coma, chronic pulmonary edema.
Methane	74-82-8	3	Yes	No	No	NA	Colorless, odorless, and tasteless gas. A simple asphyxiant. Very dangerous fire and explosion hazard when exposed to heat or flame.
Mixed Xylenes	1330-20-7	3	Yes	Yes	No	100	Colorless flammable liquid which exist in three isomeric forms. Exposure to xylene vapors may cause irritation to the eyes, nose, and throat. Systemic effects associated with acute exposure to xylene vapors may include central nervous system depression and minor reversible effects upon liver and kidneys.
Toluene	108-88-3	3	Yes	Yes	No	50	Colorless flammable distillate from coal tar which as an aromatic odor. Routes of entry include inhalation and skin absorption. Signs and symptoms include dermatitis, nausea, vomiting, headache, dizziness and irritability.
1,2-Dichloroethane	75-34-3	3	Yes	Yes	Yes	10	Flammable, colorless, clear liquid with a pleasant odor. Moderately toxic by inhalation and skin absorption. Effects of overexposure include cough, vomiting, nausea, cyanosis, and coma. Is a severe eye and skin irritant. Causes corneal effects of the eye. Is a confirmed carcinogen.
1,1,2-Trichloroethane	79-00-5	3	Yes	Yes	Yes	10	Liquid with a pleasant odor. Moderately toxic by inhalation and skin absorption. Overexposure has a narcotic effect and may cause injury to the liver and kidneys. Eye and severe skin irritant. Suspected carcinogen.

TABLE A-1
TOXICOLOGICAL AND PHYSICAL PROPERTIES OF COMPOUNDS OF POSSIBLE CONCERN

Compound	CAS	Hazard[b]	Volatility[c]	Skin Abs[d]	Carcinogen[e]	Exposure Limit (ppm)[f]	Comments
Tetrachloroethene	127-18-4	3	Yes	Yes	Yes	25	Colorless liquid with a chloroform-like odor. Moderately toxic to humans by inhalation with the following effects: local anesthesia, conjunctive irritation, general anesthesia, hallucinations, distorted perceptions, coma, and pulmonary changes. An eye and severe skin irritant.
Vinyl Chloride	75-01-4	3	Yes	Yes	Yes	5	Colorless liquid or gas with a faint sweet odor. Confirmed human carcinogen producing liver and blood tumors. Moderately toxic by ingestion. A severe irritant to skin, eyes, and mucous membranes.

Notes:

[a] CAS # - Chemical Abstracts System number.

[b] Hazard Rating - Based on SAX Hazard Ratings
1 = Indicates an LC50 of 500 - 5000 ppm; or the material is combustible or has some reactivity hazard.
2 = Indicates an LC50 of 100 - 500 ppm; or the material is flammable or reactive.
3 = Indicates an LC50 of below 100 ppm; or the material is explosive, highly flammable, or highly reactive.

[c] Volatility Rating - based on vapor pressures at 20°C.
VOL = compound with vapor pressure greater than 5 mm Hg

[d] Skin Absorption - "Yes" indicates that the compound has significant skin penetration based on ACGIH 1995-1996 TLVs.

[e] Carcinogen - "Yes" indicates that the compound is a confirmed or suspected human carcinogen by the IARC, NIOSH, NTP, EPA, or ACGIH.

[f] Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices 1995-1996

TABLE A-2a
PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUES
(WORK UNIFORM)
(VALUES GIVEN IN °F WBGT)

	Work Load		
Work/Rest Regimen	Light	Moderate	Heavy
Continuous Work	86	80	77
75% Work - 25% Rest, each hour	87	82	78
50% Work - 50% Rest, each hour	89	85	82
25% Work - 75% Rest, each hour	90	88	86

TABLE A-2b
PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUES
(ANY LEVEL OF PROTECTION)
(VALUES GIVEN IN °F WBGT)

	Work Load		
Work/Rest Regimen	Light	Moderate	Heavy
Continuous Work	75	69	66
75% Work - 25% Rest, each hour	76	72	68
50% Work - 50% Rest, each hour	78	74	71
25% Work - 75% Rest, each hour	79	77	75

WBGT - Wet Bulb Globe Temperature

TABLE A-3
THRESHOLD LIMIT VALUES WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT

Air Temperature-Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
°C (approx.)	°F (approx.)	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Break
-26° to -28°	-15° to -19°	Normal	1	Normal	1	75 min	2	55 min	3	40 min	4
-29° to -31°	-20° to -24°	Normal	1	75 min	2	55 min	3	40 min	4	30 min	5
-32° to -34°	-25° to -29°	75 min	2	55 min	3	40 min	4	30 min	5	Non-emergency work should cease	
-35° to -37°	-30° to -34°	55 min	3	40 min	4	30 min	5	Non-emergency work should cease			
-38° to -39°	-35° to -39°	40 min	4	30 min	5	Non-emergency work should cease					
-40° to -42°	-40° to -44°	30 min	5	Non-emergency work should cease							
-43° & below	-45° & below	Non-emergency work should cease									

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TABLE A-4
MINIMUM LIGHTING REQUIREMENTS

Facility Name or Function	Intensity (foot candles)
Accessways	
- general indoor	5
- general outdoor	3
- exitways, walkways, ladders, stairs	10
Administrative areas (offices, drafting, meeting rooms, etc.)	50
Chemical laboratories	50
Construction areas	
- general indoor	5
- general outdoor	3
- tunnels and general underground work areas (minimum of 10 foot candles required at tunnel and shaft heading during drilling, mucking, and scaling)	5
Conveyor Routes	10
Docks and loading platforms	3
Elevators, freight and passenger	20
First aid stations and infirmaries	30
Maintenance, operating and construction areas	
- vehicle maintenance shop	30
- carpentry shop	10
- outdoors field maintenance area	5
- refueling area, outdoor	5
- shops, fine detail work	50
- shops, medium detail work	30
- welding shop	30
Mechanical/electrical equipment rooms	10
Parking areas	3
Toilets, wash and dressing rooms	10
Visitor areas	20
Warehouses and storage rooms and areas	
- stockrooms, active or bulk storage, indoors	10
- inactive storage, indoors	5
- rack storage, indoors	25
- outdoor storage	3
Work areas - general (not listed above)	30

TABLE A-5
MONITORING REQUIREMENTS

Type of Monitoring	Method of Monitoring	Location of Monitoring	Duration of Monitoring
Volatile Organic Compounds	Photoionization detector (11.2 eV minimum bulb) and/or flame ionization detector	Breathing zone of workers subject to the highest levels	Continuous during sampling activities
Combustible Gases (Methane)	Multi-function meter	Excavation	Continuous during intrusive activities
Hydrogen Sulfide (Combustible Gas)	Multi-function meter	Excavation	Continuous during intrusive activities
Benzene	Detector tube	Breathing zone of workers subject to the highest levels	When real-time volatile organic readings exceed 5 ppm sustained in the breathing zone
Vinyl Chloride	Detector tube	Breathing zone of workers subject to the highest levels	When real-time volatile organic readings exceed 5 ppm sustained in the breathing zone
Respirable Dust	Real-time dust monitor	Breathing zone of workers subject to the highest levels	Continuous with dust monitor
Noise	Noise Dosimeter and/or Sound Level Meter	Area and/or lapel of worker subject to the highest levels	Periodic with sound level meter Daily with dosimeter
Heat Stress	Wet Bulb Globe Thermometer (WBGT)	Area	Continuous
Cold Stress	Calibrated Thermometer	Area	Continuous

TABLE A-6
REAL-TIME MONITORING ACTION LEVELS

Compound Monitored	Instrument	Action Level	Response Action
Organic Vapors	Photoionization detector (11.2 eV minimum bulb) and/or Flame ionization detector	Background to 5 ppm Above 5 ppm - 25 ppm > 25 ppm	Level D Level C Evacuate Area and call the PSHM
Combustible Gases (methane)	Multi-function meter	Background to 10% of LEL >10% of LEL	Continue work Evacuate area and call the PSHM
Hydrogen Sulfide	Multi-function meter	Background to 5 ppm >5 ppm	Continue work Evacuate area and call the PSHM
Benzene	Detector tube	<0.5 ppm >0.5 ppm to 5 ppm >5 ppm	Level D Level C Evacuate area and call the PSHM
Vinyl Chloride	Detector tube	<2.5 ppm >2.5 ppm to 5 ppm >5 ppm	Level D Level C Evacuate area and call the PSHM
Dust	Respirable Dust Monitor	Background to 1mg/m^3 > 1 mg/m^3	Level D Level C & dust control
Noise	Sound Level Meter	80 dBA	Hearing Protection
Temperature Extremes	WBGT or Thermometer	See Tables B-2 and B-3	Work/Rest Regimen

TABLE A-7 Level D PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS		
Route of Exposure	**Protection Required**	**Type of PPE**
Respiratory	No	
Head	Yes	Hard Hat meeting ANSI Z89.1
Eyes	Yes	Safety glasses (with side shields) meeting ANSI Z87.1
Ears	Yes*	Hearing protectors with adequate Noise Reduction Rating (NRR) (at least 28 NRR)
Hands	Yes*	Leather or sturdy work gloves. Chemical resistant gloves will be supplied for Modified Level D activities.
Body	Yes	Chemical resistant coveralls will be supplied for Modified Level D activities.
Feet	Yes	Work boot meeting ANSI Z41.1-75 (Steel toe and shank)

*As assigned by the SSHO, based on specific tasks and site conditions.

TABLE A-8 MODIFIED LEVEL C PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS		
Route of Exposure	**Protection Required**	**Type of PPE**
Respiratory	Yes	Air purifying, negative pressure, ½-face cartridge Respirator with combination cartridge for 1,000 ppm organic vapors and dusts (HEPA)
Head	Yes	Hard Hat meeting ANSI Z89.1
Eyes	Yes	Safety glasses (with side shields) meeting ANSI Z87.1
Ears	Yes*	Hearing protectors with adequate NRR
Hands	Yes	Chemical resistant inner and outer gloves
Body	Yes*	Chemical resistant coverall
Feet	Yes	Work boot meeting ANSI Z41.1-75

*As assigned by the SSHO, based on specific tasks and site conditions.

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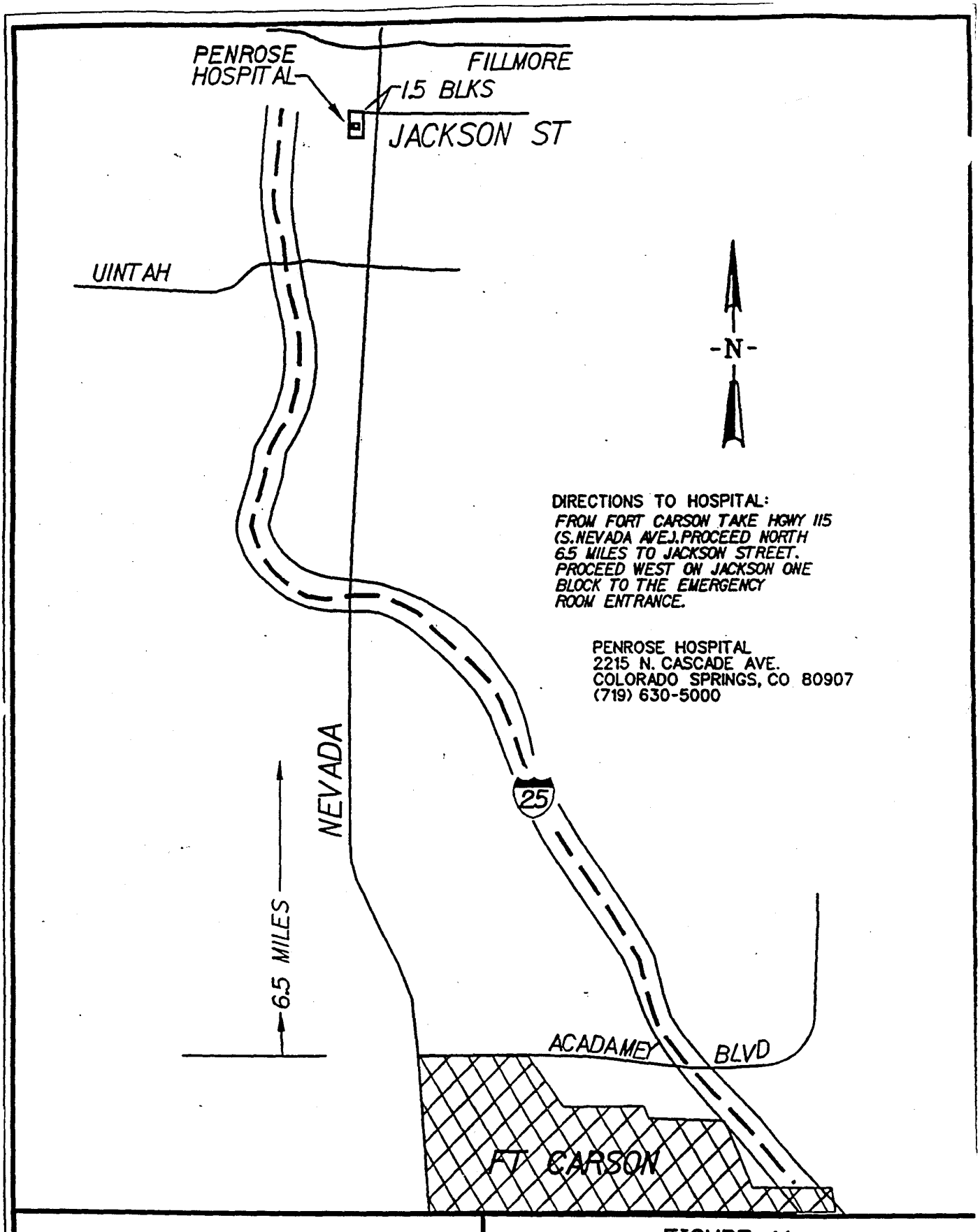
TABLE A-9 LEVEL B PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS		
Route of Exposure	**Protection Required**	**Type of PPE**
Respiratory	Yes	Full Face SCBA/Airline (with 5-minute escape bottle)
Head	Yes	Hard Hat meeting ANSI Z89.1
Eyes	Yes	Full Face SCBA/Airline Respirator
Ears	Yes*	Hearing protectors with adequate NRR
Hands	Yes	Chemical resistant inner and outer gloves
Body	Yes*	Chemical resistant coverall
Feet	Yes	Work boot meeting ANSI Z41.1-75

*As assigned by the SSHO, based on specific tasks and site conditions.

FIGURES



RUST ENVIRONMENT & INFRASTRUCTURE

FIGURE A1
DIRECTION TO
OFF-SITE HOSPITAL
FORT CARSON

ATTACHMENTS

RUST ENVIRONMENT & INFRASTRUCTURE

Confined Space Entry Permit

A.1 PROJECT INFORMATION

Project Name _____

Project Number _____

LOCATION and DESCRIPTION of confined Space _____ Date _____

PURPOSE of Entry _____ Time _____ M

DEPARTMENT _____ Expiration _____ M

Attendant _____ Entrants _____

Supervisor's Authorization (Lead Person) _____ Entrants _____

A.2 EQUIPMENT AND MONITORING

A.2.1 Equipment

Item (s)	Yes	No	Item(s)	Yes	No
Traffic Safety Equipment			Calibrated Monitoring Equipment		
Entry Tools			Escape Pack		
Hardhat			Ventilator/Blower		
Safety Glasses/Goggles			Communications		
Steel-Toe Shoes			CSE Sign		
Harness/Rope			Specify other Per Appendix B T.00.023		

A.2.2 Monitoring

Test(s) to be taken ① Test(s) conducted by:		Acceptable Entry	Not Acceptable Go To Item 3	Multiple Locations					
				Site: Date:	Site: Date:	Site: Date:	Site: Date:	Site: Date:	Site: Date:
Test	P.E.I.	Yes	No						
% of Oxygen	19.5%-23.5%								
% of L.E.L.	Less than 10%								
Hydrogen Sulfide	Less than 10 ppm								
Toxics ②									
Other ③									

A.3 LEVEL II PROCEDURES

A.3.1 A confined space with an atmosphere which is not within all of the limits (PELs) specified above may be ventilated and may be entered when sampling indicates an atmosphere within the specified PELs.

- Regardless if atmosphere has been rendered safe in this situation prior to entry, the local emergency response authority must be notified.

*****OR*****

A.3.2 In the event an atmosphere cannot be brought within the limits specified above for oxygen, hydrogen sulfide, toxic substances or combustible gases, DO NOT enter. Halt work activities. Re-evaluation of the work task is required. Immediately contact supervisor and REHSM. Entry at a later date may be allowed provided the entry team is properly trained and equipped.

A.4 EMERGENCY RESPONSE

Local Emergency Response (Phone) _____

Ambulance (Phone) _____

Fire (Phone) _____

Police (Phone) _____

NOTES: P.E.L. - Permissible Exposure Limit

L.E.L. - Lower Explosive Limit

① - Monitoring shall be continuous and throughout confined space.

② - Any toxic substances suspected or known prior to entry may require specific detection equipment (i.e. HNU, detector tubes).

③ - Other I.e., Dust that obscures vision at distance of 5 ft. or less, etc.

COMMENTS: _____

_____

_____

APPENDIX B

TASK-SPECIFIC ENVIRONMENTAL PROTECTION PLAN
LANDFILL 2 GRADEFILL

TASK-SPECIFIC ENVIRONMENTAL PROTECTION PLAN
LANDFILL 2 GRADEFILL
FORT CARSON, COLORADO

Contract No. DACW45-94-D-0001
Delivery Order No. 0027

Prepared for:
U.S. Army Corps of Engineers
Omaha District

Prepared by:
Rust Environment & Infrastructure
Englewood, Colorado

Rust Project No. 55253.0000 WBS 743

January 1998

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ATTACHMENTS

Attachment B-1 Emergency Response Team Phone Numbers
Attachment B-2 Air Quality Construction Activity Permit Applications, Fugitive Particulate Emissions Control Plan

LIST OF ACRONYMS AND ABBREVIATIONS

CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
CMP	Contract Management Procedure
OHM	OHM Remediation Services
Rust	Rust Environment & Infrastructure
SSHP	Site Safety and Health Plan

B1.0 INTRODUCTION

This Environmental Protection Plan for the Landfill 2 Gradefill addresses the performance of all work in such a manner as to minimize the polluting of air, water, or land, and shall, within reasonable limits, control noise and the disposal of solid waste materials, as well as other pollutants. This Plan identifies the procedures that will be followed during grading activities for Landfill 2 by the Contractor and all subcontractors, hereafter referred to as the Contractor. Rust Environment & Infrastructure (Rust) is the Contractor for the gradefill activities at Landfill 2, and the major subcontractor is OHM Remediation Services (OHM).

B2.0 GENERAL REQUIREMENTS

B2.1 PRECONSTRUCTION SURVEY

Prior to start of any onsite construction activities, a condition survey will be performed, after which the Contractor shall prepare a brief report indicating on a layout plan the condition of trees, shrubs, and grassed areas immediately adjacent to the site of the work and adjacent to his assigned storage area and access route(s) as applicable. This report will be signed by both the Contracting Officer's Representative and Contractor upon mutual agreement as to its accuracy and completeness.

B2.2 PROTECTION OF LAND AREAS

Except for work areas, storage areas, or access routes specifically assigned for use under this contract, the land areas outside the limits of permanent work shall be preserved in their present condition in accordance with the Total Environmental Restoration Contract (TERC) Contract Management Procedures (CMPs). Construction activities shall be confined to areas defined on the final design plans or specifically assigned for use. Storage areas and access routes required temporarily by the Contractor in the performance of the work will be assigned by the Contracting Officer's Representative in accordance with the CMPs. No other areas on Government premises shall be used by the Contractor without written consent of the Contracting Officer's Representative.

B2.3 PROTECTION OF TREES AND SHRUBS

Except for trees or shrubs within the excavation and fill grade areas shown in the Grading Plans for Landfill 2, the Contractor shall not deface, injure or destroy trees or shrubs, nor remove or cut them without special authority. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorages.

B2.3.1 Tree Protective Structures

Where, in the opinion of the Contracting Officer's Representative, trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or by his other operations, he may direct the Contractor to provide temporary protection of such trees by placing boards, planks, or poles around them.

B2.3.2 Restoration of Damaged Trees

Any tree scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the Contractor's expense. All scars made on trees not designated on the plans to be removed by construction operations shall be coated as soon as possible with an approved tree wound dressing. Trees that are to remain, either within or outside established clearing limits, that are damaged by the Contractor so as to be beyond saving in the opinion of the Contracting Officer's Representative, shall be immediately removed, if so directed, and replaced with a nursery-grown tree of the same species and size.

B2.4 PROTECTION OF WATER RESOURCES

The Contractor shall control the disposal of fuels, oils, bitumens, calcium chloride, acids or harmful materials, both on and off the Government premises and shall comply with applicable Federal, State, County and Municipal laws concerning pollution of rivers, streams, and wetlands while performing work under this contract. Special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, herbicides, and insecticides from entering public waters. Water used in onsite material processing, concrete curing, foundation and concrete cleanup, and other waste waters shall not be allowed to reenter a stream if an increase in the turbidity of the stream could result therefrom. Spill prevention procedures are outlined in detail in the Storm Water Pollution Prevention Plan (Appendix D).

B2.5 WASTE DISPOSAL

Waste disposal methods are described in the Waste Management Plan (Appendix C). Waste materials are stored in designated areas. If any waste is dumped in unauthorized areas, the Contractor shall remove the waste and restore the area to the condition of the adjacent undisturbed areas. Where directed, soil which is contaminated by the Contractor shall be excavated, disposed of as approved by the Contracting Officer's Representative, and replaced with suitable fill material, all at the expense of the Contractor.

B2.5.1 Disposal of Regulated and Non-Regulated Waste

The Contractor shall comply with all Federal, State, and local regulations and requirements concerning proper handling, accumulation, and disposal of regulated wastes. Handling, accumulation, and disposal of regulated wastes shall be in accordance with Title 40 Code of Federal Regulations (CFR) Parts 260-280, Title 49 CFR Parts 171-173 and the Colorado Hazardous Waste Management Act (CHWMA). The Contractor shall be liable for all fines assessed against Fort Carson as a result of Contractor noncompliance with the above referenced regulations. The Contractor is encouraged to use non-hazardous materials in lieu of hazardous materials whenever the opportunity exists.

B2.5.1.1 Training

The Contractor is responsible for ensuring all Contractor personnel that handle or are exposed to hazardous waste are trained in accordance with the above regulations.

B2.6 BURNING

Burning is prohibited on the Government premises.

B2.7 PEST (VECTOR) CONTROL

Fort Carson shall be responsible for vector control. The Contractor shall be responsible for contacting Fort Carson two weeks prior to mobilization. The work area will be cleared of burrowing animals by Fort Carson wildlife division. The wildlife division will exterminate burrowing animals by gassing. Future vector control will be by means of establishing and maintaining tall vegetation.

B2.8 DUST CONTROL

The Contractor shall maintain all excavations, stockpiles, access roads, plant sites, waste areas, and all other work areas free from excess dust to such reasonable degree as to avoid causing a hazard or nuisance to the Using Service or to others. Approved temporary methods consisting of sprinkling, approved chemical treatment, light bituminous treatment, or similar methods will be permitted to control dust. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs as identified in the Site Safety and Health Plan (SSHP) (Appendix A). The

Contractor shall comply with the Fugitive Dust Control Plan for Land Development which is discussed in Section B4.0.

B2.9 EROSION AND SEDIMENT CONTROL

The Contractor shall be responsible for providing erosion and sediment control measures in accordance with local, State, and Federal regulations as outlined in the Storm Water Pollution Prevention Plan (Appendix D). The erosion and sediment controls selected and maintained by the Contractor shall be such that local, State, and Federal water quality standards are not violated as a result of the Contractor's construction activities. Any deficiencies in the Contractor's controls determined by the Contracting Officer to have caused a violation of water quality standards shall be remedied by the Contractor at his own expense. The area of bare soil exposed at any one time by construction operations should be held to a minimum. Specific erosion and sediment control measures required during construction of the caps are identified in the Storm Water Pollution Prevention Plan.

B2.10 CORRECTIVE ACTION

The Contractor shall, upon receipt of a notice in writing of any noncompliance with the foregoing provisions, take immediate corrective action. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs of damages by the Contractor unless it was later determined that the Contractor was in compliance.

B2.11 POST-CONSTRUCTION CLEANUP

The Contractor shall, unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work.

B2.12 ARCHEOLOGICAL PRESERVATION

Should the Contractor uncover any skeletons, artifacts, or other archeological remains during the course of excavation, the work shall be stopped and the Contracting Officer notified immediately.

B2.13 SPILL RESPONSE AND CLEAN-UP OF SPILLED MATERIALS

A spill is the uncontrolled or accidental release of a hazardous substance that may have an adverse impact on human health or the environment. A spill is considered any material including solid debris that may leak, spill, or flow outside of the intended Containment Area. The purpose of the spill response effort will be to identify the character, source, amount, and extent of released material and assess the possible hazards to human health and the environment. The initial response to any spill or discharge will be to protect human health and safety followed by concern for environmental impact.

All non-hazardous and non-regulated material spillage shall be immediately and thoroughly cleaned up and removed from the site at the end of each day. In the event of a spill of a hazardous or regulated material, the Contractor shall immediately notify the Contracting Officer's Representative. The Contractor shall be responsible for the immediate and long-term cleanup of all spilled material and associated contaminated media in accordance with all Environmental Protection Agency (EPA) and Colorado Department of Public Health and Environment (CDPHE) regulations and requirements.

B2.13.1 Spill Response Control Materials and Equipment

Rust and their subcontractors plan to maintain the following equipment and materials onsite for use during the Cap Installation Project:

- Absorbent booms, pillows, and pads;
- Granular absorbent material (noncombustible);
- Polyethylene sheeting;
- 85-gallon salvage drums for collection of spill materials;
- 55-gallon drums for collection of spill materials;
- Shovels, hand tools, and scrub brushes;
- Solutions [detergent and water] for decontamination of personnel;
- Decontamination facility and high pressure washer for equipment;
- Self-contained breathing apparatus (SCBA); and
- Chemical-resistant garments (i.e., Saranex, nitrile gloves, etc.).

B2.13.2 Response Actions for Spills, Leaks, or Discharges

If a spill, leak, or discharge is observed, the following actions shall be immediately implemented:

- Site workers contain and isolate the spill area;
- Boundaries are established around the discharge area;
- Personnel are evacuated from adjacent work and low-lying areas;
- Unnecessary people are kept away and entry is denied to unauthorized personnel;
- Command post is established upwind of spill area;
- Contact with spill material is avoided at all times;
- If appropriate, noncombustible material is used (i.e., sand, soil, water) to suppress gases and vapors;
- Hazards are identified based on available information from witnesses and/or available documents (placards, material safety data sheets [MSDS] sheets, logs). Observations are made, including real time air monitoring, to evaluate and identify hazards and to determine the proper personal protection levels, methods, and equipment necessary for response;
- The spill or release area is approached cautiously in the appropriate level of protective equipment, as determined by the hazard analysis described above, while performing real-time air monitoring. Exposure monitoring requirements and hazard analyses are presented in detail in Appendix A. Attempts to contain the spill will initially be made without entering the immediate hazard area; and
- Site entry is made with emergency response personnel, the personal protective equipment (PPE), control methods, and equipment necessary to perform work. Hazardous spill containment and collection will be performed in five steps as follows:
  - Containment of the spill: With absorbent socks, booms, and granules and/or construction of temporary dikes.
  - Control at the source: By plugging leaks, uprighting containers, overpacking containers, pumping out a leaking container.
  - Collection of liquid sludge and/or solid: Absorb with sand, clean fill, or other noncombustible absorbent material. Solid debris will be collected by hand or shovel and placed in drums.

- Storage of the spill material: After an emergency involving cleanup of released materials, the stored materials will be temporarily held onsite.

- Disposal of spill materials and decontamination residues: Treatment and/or disposal options of the material will depend on the amount of and type of material.

If site personnel cannot safely and/or sufficiently respond, evacuation of the area is warranted. Additional response personnel will be notified to respond and assist in containment and cleanup of the spill material. After response to the incident and follow-up procedures have been completed, operations may resume.

B3.0 EMERGENCY RESPONSE PLAN AND CONTINGENCY PROCEDURES

The emergency response plan and contingency procedures are included in the Fort Carson Programmatic SSHP (Rust, January 1996). The Programmatic SSHP outlines procedures for pre-emergency planning, prevention, and response to spills, fire, explosion, or release of hazardous materials from the facility during the life of the project. The plan also describes personnel responsibilities and evacuation procedures. A list of phone numbers for emergency contacts and response team members is included as Attachment B-1 to this Appendix.

B4.0 FUGITIVE DUST CONTROL PLAN FOR LAND DEVELOPMENT

The El Paso County Department of Health and Environment requires that a fugitive partial emissions control plan be submitted by applicants whose source/activity results in fugitive dust emissions. The control plan must enable the source to minimize emissions of fugitive dust to a level that is technologically feasible and economically reasonable. If the control plan is not adequate in minimizing emissions, a revised control plan may be required. Because the area being disturbed is less than 25 acres, a fugitive dust control plan will not be required by CDPHE. An Air Quality Construction Activity Permit has been completed for submittal to the El Paso County Department of Health and Environment prior to field activities at the landfill, and is enclosed as Attachment B-2.

ATTACHMENT B-1

EMERGENCY RESPONSE TEAM PHONE NUMBERS

ATTACHMENT B-1
EMERGENCY RESPONSE TEAM PHONE NUMBERS

Name	Title	Organization	Telephone Number
Project Emergency Contacts - Notify immediately of incident			
Bob Hulet	Construction Manager	OHM	(719) 540-5933
Rick Jennings	Site QA Manager	Rust	(719) 527-0121
Jason Haugh	Onsite Health & Safety Coordinator	OHM	(719) 540-5933
Wendy Johnson, CIH	Safety & Health Officer	Rust	(303) 694-6660
Scott Olson	Task Manager	Rust	(303) 694-6660
John England, P.E.	Project Manager	Rust	(3030 694-6660
Fort Carson Emergency Contacts			
Building 1818	Health & Safety Office	Fort Carson	(719) 526-7000
Jim Henderson	Environmental Coordinator	Fort Carson	(719) 526-8001
Explosive Ordnance Detail	EOD Response Line	Fort Carson	(719) 526-2643

Other Emergency Numbers

Local Emergency Contacts	
Fire/Rescue	9-911
Ambulance	9-911
Police	9-911
Poison Control Center	1-800-424-8802
Utility Notification Center of Colorado	1-800-922-1987
National Response Center	1-800-424-8802
Fort Carson Information	(719) 526-5811
Fort Carson Security Desk (24-Hour):	(719) 526-2333; If on post, dial 2123

Medical Facility

Offsite Medical Facility:	Penrose Hospital 2215 N. Cascade Avenue Colorado Springs, CO 80907 Main Number: (719) 630-5000
Directions to Offsite Hospital:	From Fort Carson, take Highway 115 (S. Nevada Avenue). Proceed North 6.5 miles to Jackson Street. Proceed West on Jackson one block to Emergency Room Entrance.

ATTACHMENT B-2

AIR QUALITY CONSTRUCTION ACTIVITY PERMIT APPLICATIONS, FUGITIVE PARTICULATE EMISSIONS CONTROL PLAN

EL PASO COUNTY DEPARTMENT OF HEALTH AND ENVIRONMENT
AIR QUALITY CONSTRUCTION ACTIVITY PERMIT APPLICATION

FUGITIVE PARTICULATE EMISSIONS CONTROL PLAN

Estimated total disturbed acreage subject to wind erosion: 12 acres.

CONTROL METHODS: Fill in appropriate methods:

1. Restrict traffic to established roads where practical: YES NO
2. Speed control (explain): 15 mph maximum - speed limit signs
3. Limiting disturbed area (explain - phasing, etc.): Final cap will be reseeded.
4. Revegetation (specify type/location - use site map): _____
5. Mulch (explain): _____
6. Compaction (specify location, number, and type of equipment): _____
7. Watering: as needed _____ times/daily, or as needed.
8. Chemical stabilizers (explain, include frequency and location on map): None
9. Steep slopes (specify control and location): Silt fencing, straw bale
10. Other: _____
11. Wind breaks (snow, solid fence, berm, furrows, vegetation, etc.), specify: _____
12. Stockpile controls (explain): Silt fence
13. Haul Roads:
    a. Paved (specify controls, frequency of cleanup): Private
    b. Unpaved (specify controls, frequency): _____

CONTRACTOR INFORMATION

Please Print Date: 1 / 8 / 98 (MO / Day / Year)

1. Ownership Type: Sole Owner Partnership Corporation Other: _____
2. Business Name: Rust Environment & Infrastructure
3. Doing Business as: Same
4. Owner's Name: Last _____ First _____ MI _____
5. Business Address: 5575 DTC Parkway, Suite 200

   City Englewood State CO Zip 80111
6. Work Phone: (303) - 694-6660 7. Fax Phone: (303) - 694-4410

   Extension: _____
8. Mailing Address: _____

   Care of: _____
   (if different from business address)

Applicant's Signature: _____ Date: 1 / 8 / 98 (MO / Day / Year)

EL PASO COUNTY DEPARTMENT OF HEALTH AND ENVIRONMENT
AIR QUALITY CONSTRUCTION ACTIVITY PERMIT APPLICATION

PROJECT SITE INFORMATION

Please Print

1. Project Name: SWMU 2

2. Project Site Address: Fort Carson

   City Colorado Springs State CO Zip 80913

   Cross Street: Academy Blvd and I-25

3. Phone: (____) - _____ 4. Fax Phone (_____) - _____

APPENDIX C

WASTE MANAGEMENT PLAN
LANDFILL 2 GRADEFILL

WASTE MANAGEMENT PLAN
LANDFILL 2 GRADEFILL
FORT CARSON, COLORADO

Prepared for:
U.S. Army Corps of Engineers
Omaha District

Prepared by:
Rust Environment & Infrastructure
Englewood, Colorado

Rust Project No. 55253.000 WBS 743

January 1998

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ATTACHMENT 1 WASTE PROFILE SHEET

LIST OF ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
DOT	Department of Transportation
FLPM	Field and Laboratory Procedures Manual
IDW	Investigation-Derived Waste
IWTP	Industrial Waste Water Treatment Plant
LEL	Lower Explosive Limit
NPDES	National Pollutant Discharge Elimination System
PID	Photoionization Detector
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
RCRA	Resource Conservation and Recovery Act
Rust	Rust Environment & Infrastructure
SSHP	Site-Specific Safety and Health Plan
SVOC	Semivolatile Organic Compound
TAL	Target Analyte
TSD	Treatment, Storage, and Disposal
USACE	U.S. Army Corps of Engineers
VOC	Volatile Organic Compound

C1.0 INTRODUCTION

The purpose of this plan is to identify the types of liquid and solid wastes that will be generated during the Landfill 2 gradefilling activities, and to establish a waste management method appropriate for each waste type. The wastes are largely the result of construction activities and include non-hazardous soil generated during landfill delineation activities and cap installation activities. During the project, landfill waste will be relocated and used as gradefill. Some of this waste may be identified as hazardous and will be segregated for disposal. Liquid wastes generated during the project include decontamination rinse water. Incidental non-hazardous wastes from site administration will also contribute to the total waste produced. The quantities listed in the plan are estimates and may vary somewhat due to unknown field conditions.

This plan is organized into five major sections. In addition to this introductory section, Section C2 describes the management of liquid wastes; Section C3 describes the management of solid wastes; Section C4 describes the required documentation; and Section C5 describes onsite storage methods. Sections C2 and C3 include subsections that identify the various waste types, discuss a schedule of generation, identify the waste management method for each waste type, and identify the method of transportation. The plan is designed to be used as a supplement to other project plans such as the Task-Specific Health and Safety Plan and the Task-Specific Environmental Protection Plan.

C2.0 LIQUID WASTE

C2.1 WASTE TYPES AND CHARACTERISTICS

Three types of liquid wastes are likely to be generated during gradefill activities: potentially contaminated free liquids; decontamination rinse water; and non-hazardous incidental wastewater. A description of each waste type is provided in the following paragraphs.

C2.1.1 Free Liquids

Potentially contaminated free liquids such as leachate, surface runoff, and liquids produced by subsurface dewatering procedures may be collected at Landfill 2 during construction activities. The liquids will be containerized in 55-gallon drums or large capacity frac tanks, depending on the anticipated quantities, and temporarily stored at the landfill. Samples will be collected from the containerized liquids and analyzed to evaluate the appropriate disposal method. These samples will be tested for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, herbicides, and target analyte (TAL) metals in accordance with the Field and Laboratory Procedures Manual (FLPM) (Rust Environment & Infrastructure [Rust], April 1997).

As discussed in Section C2.3.1, the free liquids encountered during construction activities can be discharged to the Industrial Waste Water Treatment Plant (IWTP) as long as the analytical results indicate that the wastes meet the influent criteria for the IWTP. If the analytical results indicate that the liquid is a characteristic waste or contains any contaminants which do not meet the influent criteria for the IWTP, the liquid would be disposed at an offsite treatment, storage, and disposal (TSD) facility as specified in Section C2.3.2. Treatment of all liquid wastes at the IWTP shall be performed in accordance with the existing National Pollutant Discharge Elimination System (NPDES) Permit.

C2.1.2 Decontamination Rinse Water

Decontamination rinse water will be generated during cleaning of construction equipment, hand tools, disposables, and personal protective equipment (PPE). These samples will be tested for VOCs, SVOCs, pesticides, herbicides and TAL metals in accordance with the FLPM. The rinse water will

be contained and collected in a sump, containerized, sampled, and analyzed. The decontamination rinse water can be discharged to the IWTP as long as analytical results indicate that the wastes meet the influent criteria, as discussed in Section C2.3.1. If the analytical results indicate that the liquid does not meet the influent criteria for the IWTP, the decontamination rinse water would be disposed at an offsite TSD facility as specified in Section C2.3.2. The sampling frequency will be based on the type and size of container selected.

C2.1.3 Incidental Wastewater

Incidental non-hazardous wastewater such as sanitary waste, laundry wastewater, and shower wastewater may be generated during the construction activities. Incidental wastewater may be generated at the administration area near Landfill 5. Depending on the final approach to site administration, these wastes may be containerized and stored at the Rust storage trailer compound or fed directly to the sanitary sewer system from existing facilities with sewer connections. Non-hazardous wastewater stored at the administration trailer compound will be picked up and disposed of by a contractor at the onsite Fort Carson IWTP (Section C2.3.1).

C2.2 SCHEDULE OF WASTE GENERATION

Construction activities will generally be performed for 10 hours per day, four days per week, unless special circumstances require an extended schedule. Incidental and decontamination wastewater generation is expected during this construction phase.

C2.3 WASTE MANAGEMENT METHODS

C2.3.1 Onsite Fort Carson Disposal

Except for incidental wastewater, all liquid wastes will be containerized. The decontamination fluids and free liquids will be sampled and analyzed to determine the approach for disposal. In accordance with Code of Federal Regulations (CFR) 261.4 (a) (1) and (2), investigation-derived waste (IDW) from a Resource Conservation and Recovery Act (RCRA) facility can be discharged under an NPDES permit since such discharges are excluded from RCRA regulations as long as these discharges comply with the Clean Water Act regulations. In the case of the Fort Carson IWTP, the

decontamination fluids from the installation of soil gas monitoring probes is an IDW and can be discharged to the IWTP as long as the IDW is not a characteristic waste.

The liquid wastes encountered during remediation will be handled in a manner consistent with the liquid IDW. These construction wastes may include free liquids encountered during construction activities and the rinse water from the decontamination of construction equipment. The regulations permit discharge of these wastes under an NPDES permit as long as these discharges comply with the Clean Water Act regulations. The analytical results from the sampling of these wastes will be used to determine if they are not a characteristic waste and can be consequently disposed in the IWTP. Analytical results will be supplied to Fort Carson and the U.S. Army Corps of Engineers (USACE). Liquid wastes from remediation will be treated at the onsite Fort Carson Waste Water Treatment System if no characteristic wastes are encountered and if the waste is not considered a listed waste.

C2.3.2 Hazardous Waste Disposal

Hazardous wastes are not anticipated, however, if they are encountered, they will be treated and disposed of in accordance with State and Federal regulations. Analytical results will be evaluated and the proper waste code(s) will be assigned. Rollins has been selected as the hazardous waste disposal facility based on an assessment of disposal fees. The disposal facility will provide pretreatment to achieve land disposal restrictions if required.

C2.4 TRANSPORTATION

C2.4.1 Onsite Transportation

Liquids being sent to the onsite Fort Carson IWTP will be transported using light trucks, flatbeds, vacuum trucks, or other appropriate moving equipment.

C2.4.2 Offsite Transportation

Transportation of liquid waste to an offsite disposal facility will be contracted to the respective treatment/disposal contractor. Trucks or railcars will be used as appropriate. Transportation will be in accordance with Department of Transportation (DOT) requirements.

C3.0 SOLID WASTE

C3.1 WASTE TYPES AND CHARACTERISTICS

Five categories of solid waste are anticipated to be generated during landfill cap construction and are described in the following subsections. These wastes include excavated waste material, construction related debris, PPE, and incidental waste.

C3.1.1 Excavated Waste Material

Excavation operations include trenching, excavating, grading, and other unearthing operations. Real-time air monitoring will be conducted during all excavation activities. Real-time air monitoring will be conducted using a photoionization detector (PID), a lower explosive limit (LEL) meter, and an oxygen level meter. Real-time air monitoring will be used in conjunction with field observation of the material being excavated. Detector tubes may also be used during excavation activities as identified in the Site-Specific Safety and Health Plan (SSHP).

Excavation activities are anticipated to be performed in modified Level D protection (Table A-7 of Appendix A). Excavated waste will be placed within the footprint of the existing landfill as gradefill, and wastes from other sites will not be placed inside the site. If suspected hazardous material is detected by visual observation or exceedance of air monitoring action levels, an upgrade to Level C (Table A-8 of Appendix A) will occur and the suspect material will be contained. 55-gallon drums will typically be used. If monitoring indicates that hazardous conditions are present (i.e., PID, combustible gas meter, or detector tubes indicate the action levels listed on Table A-6 of the SSHP are exceeded), the work area will be evacuated and the Project Health and Safety Officer will be contacted to further evaluate the situation. An identified hazardous waste will only be excavated up to the limit of excavation shown on the final design drawings.

Samples will be collected from the containerized material and analyzed to evaluate the appropriate disposal method. These samples will be tested for VOCs, SVOCs, pesticides, herbicides and TAL metals in accordance with the FLPM. If the waste is not a listed waste and analytical results indicate that the material is not a characteristic waste, the waste will be placed within the footprint of the

existing landfill as gradefill. If the analytical results confirm that the material is a hazardous waste, the waste will be disposed of as specified in Section C3.2.2. Waste materials from other sites will not be placed within the landfill.

C3.1.2 Miscellaneous Construction-Related Debris

Miscellaneous construction debris such as pallets, cement, and plastic sheeting will be collected in rolloff containers located at the operations support area for each landfill. These wastes are non-hazardous and will be disposed of at the onsite Fort Carson Landfill (Section C3.2.1).

C3.1.3 Personal Protective Equipment

Most construction activities will be conducted in Level D protection. When activities require an upgrade in PPE, the resulting equipment such as protective suits, gloves, booties, tape, and respirator cartridges will be placed in specially marked containers in the work area. PPE is considered non-hazardous and full containers will be sealed, marked, and disposed of at the onsite Fort Carson Landfill (Section C3.2.1) unless hazardous wastes are encountered during the evaluation of excavated waste materials during gradefill operations. If hazardous waste are encountered, the associated PPE will be drummed and shipped offsite for disposal at a TSD facility.

C3.1.4 Incidental Wastes

During construction activities, incidental non-hazardous wastes will be generated. These wastes include office waste, lunch room waste, equipment and material packaging, crates, and uncontaminated containers. These domestic non-hazardous wastes will be accumulated in a rolloff container near the administrative area and will be disposed at the Fort Carson landfill (Section C3.2.1).

C3.1.5 Soil Cuttings From Gas Probes

All of the soil cuttings generated during the installation of the four monitoring probes at Landfill 2 will be drummed separately and managed in accordance with the FLPM. In general, this IDW will be considered solid waste and disposed of at the onsite Fort Carson landfill because the drilling is not being conducted within the landfill. If elevated headspace measurements are recorded from any soil

samples collected or visual inspection of the soil cuttings and soils in the continuous core barrels indicates potential contamination, a soil sample will be collected from that zone and will be submitted to the laboratory to characterize the soils. These soil samples will be analyzed for VOCs, SVOCs, pesticides, herbicides, and TAL metals in accordance with the FLPM. These cuttings will be managed depending on the analytical results of the soil samples as discussed in Section C3.1.1.

C3.2 WASTE MANAGEMENT METHODS

C3.2.1 Onsite Fort Carson Landfill

Non-hazardous waste consisting of construction debris (pallets, scrap polyvinyl chloride [PVC], plastic sheeting), soil cuttings from vapor probe installation, PPE, and incidental wastes will be disposed at the onsite Fort Carson landfill.

C3.2.2 Hazardous Waste Landfill

Hazardous wastes are not anticipated, however, if they are encountered, they will be disposed of in accordance with State and Federal regulations. Based on assessments of disposal fees, the Rollins (Highway 36) TSD facility has been selected as the preferred disposal site. The disposal facilities will provide pretreatment to achieve land disposal restrictions if required.

C3.3 TRANSPORTATION

C3.3.1 Onsite Transportation

Materials being sent to the onsite Fort Carson landfill will be transported by the appropriate contractor using light trucks, flatbeds, or other appropriate moving equipment. All waste loads will be covered during transportation.

C3.3.2 Offsite Transportation

Transportation of hazardous waste to the offsite TSD facility will be contracted to the respective treatment/disposal contractor. Trucks or railcars will be used as appropriate. Transportation will be in accordance with all applicable State, Federal, and DOT requirements.

C4.0 DOCUMENTATION

C4.1 DOCUMENTATION OF WASTE MANAGEMENT

A hardcopy record keeping system will be used to track IDW from the point of waste generation to the storage location, and through final waste disposition, as described in Section 2.16 of the FLPM. When a container is filled, information about the waste is recorded including waste type and generation date. The Container Inspection Form will be used to document waste management practices such as storage, spill remediation, and container and label maintenance. If the waste is transported for treatment or disposal, the details of the waste disposition will also be recorded.

C4.2 WASTE PROFILE

Prior to disposal at a hazardous waste TSD facility, a waste profile sheet must be completed. Each disposal facility has its own waste profile sheet and analysis requirements; however, many of the forms are similar. The profile sheet includes waste generation information and waste characteristics. The turnaround time may vary depending on the waste type and TSD facility, but generally is less than two weeks. A typical profile sheet has been included as Attachment 1 at the end of this Appendix.

C4.3 MANIFESTS

A hazardous waste manifest will accompany each shipment of hazardous waste. These manifests will be completed in accordance with 40 CFR Part 262 Subpart B, and 6 CCR 1007-3 Part 262, Subpart B.

C5.0 STORAGE

Drums and rolloff containers will be used for temporary storage of waste. The containers will be kept at the staging area for the landfill until a determination has been made regarding waste characteristics and disposal options. Wastes generated inside the landfill boundary will be considered a hazardous waste when generated and will be labeled and stored appropriately. However, IDW generated outside the site may be managed as a non-hazardous waste depending on the conditions encountered during generation. IDW may then continue to be stored at the landfill staging area and monitoring well locations, or will be transported to the Fort Carson hazardous waste storage area. Waste that can be managed by containment within the landfill will likely remain onsite until the final corrective action is implemented. Drums containing hazardous waste that can not be managed by containment within the landfill cap will be stored in the Fort Carson hazardous waste storage area pending disposal. The accumulation start date will be marked on the containers and weekly inspections will be conducted. The wastes will be transported offsite for disposal within 90 days of the accumulation start date.

IDW containers will be labeled in accordance with the procedures described in Section 2.16.4 of the FLPM. Monthly inspections of the containers at the landfill staging area will be conducted. The inspections will be documented on the Container Inspection Form using the procedures outlined in Section 2.16.3.1 of the FLPM. If an IDW spill or leak is noted, Fort Carson personnel will be promptly notified.

Non-hazardous waste materials such as construction-related debris and equipment packing materials will be stored in rolloff containers or drums at the operations support area until the quantities warrant disposal. Drums will be placed on pallets and clearly marked with flags or marking tape.

C6.1 REFERENCES

Rust Environment & Infrastructure. April 1997. Field and Laboratory Procedures Manual.

ATTACHMENT 1

WASTE PROFILE SHEET

ENVIRONMENTAL SERVICES

☐ New ☐ Amendment

A. GENERATOR INFORMATION

Generator Name _____ Technical Contact _____

Facility Address _____ Telephone ( ) _____ EXT. _____

_____ Fax ( ) _____

_____ Billing Name _____

_____ Billing Address _____

City/County _____ _____

State _____ Zip Code _____ City _____ State _____ Zip Code _____

USEPA ID# _____ Attention _____

State ID# _____ Telephone ( ) _____ EXT. _____

B. DOT

Shipping Name _____

_____

_____ Hazard Class _____

UN/NA No. _____ Packing Group _____ RQ _____

C. RCRA

RCRA Non Hazardous/Exempt? ☐ Yes ☐ No Process Generating: _____

_____

State Waste Codes: _____ EPA Waste Codes: _____

_____

D. ANNUAL REPORT CODES

SIC Code: _ _ _ _

Source Code: A _ _

Form Code: B _ _ _

Origin Code: _

System Type: M _ _ _

E. OTHER COMPONENTS

	No	Yes	Total ppm
PCB's	☐	☐	_____
Cyanides	☐	☐	_____
Sulfides	☐	☐	_____
Pesticides	☐	☐	_____
Phenolics	☐	☐	_____
Dioxins	☐	☐	_____
Halogens	☐	☐	_____ %

F. PHYSICAL CHARACTERISTICS AT 70° F

1. Infectious or Biological Waste? ☐ Yes ☐ No
2. NRC Regulated Radioactive? ☐ Yes ☐ No
3. Reactivity ☐ None ☐ Water Reactive ☐ Pyrophoric ☐ Shock Sensitive ☐ Cyanides ☐ DOT Explosive ☐ Sulfides ☐ Other _____

Gas (Cylinder) ☐ _____ %
Aerosol ☐ _____ %
☐ Lab-Pack ☐ Free Liquids _____ %
100%

Solid ☐ Sludges ☐ Free Liquids

Layers
☐ Single Layered ☐ Bi-layered ☐ Multi-layered

Viscosity
☐ Low ☐ Medium ☐ High

Odor
☐ None ☐ Mild ☐ Strong Describe:

Color/Appearance:

Weight
Density _____ lbs./gal. (US. liq) _____ lbs./cu. foot
Dry Weight ☐ <1.0% ☐ 5-20% ☐ 1-5% ☐ 20-100%

pH ☐ N/A
☐ 0-2 ☐ 4.1-10 ☐ ≥ 12.5
☐ 2.1-4 ☐ 10.1-12.4 Exact _____

Flash Point (liquid only)
☐ <73°F (23°C)
☐ 73-140°F (23-60°C)
☐ 142-200°F (61-93°C)
☐ >200°F (93°C)
☐ N/A

Boiling Point
☐ <95°F (35°C)
☐ >95°F (35°C)
☐ N/A

BTU/LB.

Dermal Toxicity LD_{50} (Mg/Kg)
☐ ≤40 ☐ >200, ≤1000
☐ >40, ≤200 ☐ >1000
4. Material poisonous by inhalation? ☐ Yes ☐ No

Oral Toxicity LD_{50} (Mg/Kg)

	☐ ≤5	☐ >5, ≤50
Solids:	☐ >50, ≤200	☐ >200
Liquids:	☐ >50, ≤500	☐ >500

5. Is this waste stored in vented drums? ☐ Yes ☐ No
6. Is this waste pumpable? ☐ Yes ☐ No
7. Is this waste polymerizable? ☐ Yes ☐ No
8. Is waste stream subject to the National Emission Standards for Benzene Waste Operations (40 CFR 61 Subpart FF)? ☐ Yes ☐ No
9. Is this waste regulated as an ozone depleting substance (40 CFR part 82)? ☐ Yes ☐ No
10. Does this waste contain scrap metal pieces greater than 2 inches in size? ☐ Yes ☐ No

G. METALS

☐ NONE ☐ TCLP (MG/L) ☐ TOTAL (PPM)

	Reg. Limit	Below	Above	Range
Arsenic	5 mg/L			
Barium	100 mg/L			
Cadmium	1 mg/L			
Chromium	5 mg/L			
Copper				
Lead	5 mg/L			
Mercury	0.2 mg/L			
Nickel	134 mg/L			
Selenium	1 mg/L			
Silver	5 mg/L			
Zinc				
Others:				

H. PHYSICAL/CHEMICAL CONSTITUENTS

_____ _____ %
_____ _____ %
_____ _____ %
_____ _____ %
_____ _____ %
_____ _____ %
_____ _____ %
_____ _____ %
_____ _____ %
_____ _____ %
_____ _____ %
_____ _____ %
100 %

(Attach All MSDS, Sample Analysis and Additional Info.)

I. ANTICIPATED VOLUME

Qty.	Container	Qty.	Container
☐ ____	5 gl. pail	☐ ____	Cubic Yard Box*
☐ ____	15 gl. carboy	☐ ____	Super Sack*
☐ ____	30 gl. drum	☐ ____	Rolloff/Dump Trailer*
☐ ____	55 gl. drum	☐ ____	Tanker*
☐ ____	85 gl. drum	☐ ____	Other _____

Per ☐ 1 Time ☐ Week ☐ Month ☐ Year ☐ Other _____

(*) Is this waste regulated as a Marine Pollutant (49 CFR 171.8)? ☐ Yes ☐ No

Generator's Certification:

I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no deliberate or willful omissions of composition properties exist and that all known or suspected hazards have been disclosed. I certify that the materials tested are representative of all material described by this profile.

Generator's Authorized Signature: _____ Date _____

The following information is required for all waste to be considered for transportation, storage, treatment or disposal. Answers must not be abbreviated, must be printed in ink, and will be maintained in confidence. Responses of "none" or "not applicable" should be made when appropriate. Material Safety Data Sheets for all components of the waste should accompany this form, if available. A copy of this form should be retained by the customer.

ALL QUESTIONS MUST BE ANSWERED

Part A GENERAL INFORMATION

Part B DOT — Choose the most appropriate DOT shipping information by referring to 49 CFR 172.101.

Part C RCRA — Select applicable EPA waste codes by referencing 40 CFR 261.

Part D ANNUAL REPORT CODES — Obtain these codes from the EPA Hazardous Waste Report Booklet.

Part E OTHER COMPONENTS — Check the appropriate boxes and list the total parts per million. If data was obtained from laboratory analysis, attach a copy of the analysis.

Part F PHYSICAL CHARACTERISTICS AT 70 DEGREES F — Complete all sections. The flash point is a value attained using the appropriate test method referenced in 40 CFR 261.21. Dermal and oral toxicity can be found in chemical dictionaries or by referring to the Material Safety Data Sheet.

Part G METALS — Indicate if the metal concentrations are represented as total or leachable metals, and whether they are above or below the regulatory limit as defined by the Extraction Procedure contained in 40 CFR, Appendix II.

Part H PHYSICAL/CHEMICAL CONSTITUENTS — List all components of the waste using specific chemical names, including water, earth, or forms of debris. For each component, indicate the expected percent or other unit of measure in which the component is present. The constituents must total 100%.

Part I ANTICIPATED VOLUME — Enter the total volume to be treated, stored, or disposed.

Generator Certification: Must be signed by an authorized management representative of the company generating the waste stream described on this form.

FOR LAIDLAW ENVIRONMENTAL SERVICES USE ONLY

Sample Submitted ☐ Yes ☐ No No. of Samples _____ Chain of Custody ☐ Yes ☐ No Sample No. _____

Laidlaw Approval

☐ Approved ☐ Disapproved Approval # _____ Annual Analysis Date _____

Operations _____ Date _____

Comments _____

Phy. St. _____ Loc. Code _____ Non Reg (Y/N) _____ Haz. Label (Y/N) _____ Prim. Label _____ Sub. Label _____

Land Disposal Restrictions

☐ Unrestricted ☐ Restricted Category _____ Sub Category _____

Variance Date _____ Treatability Group: ☐ WW ☐ NWW Treatment Technology _____

Legend No. _____ 40 CFR Ref.: ☐ 268.41 CCWE ☐ 268.42 Table 2 ☐ 268.43 CCW

Routing

TSD #1 _____ TSD #2 _____

Outgoing Approval # _____ Outgoing Approval # _____

Handling Codes _____ Handling Codes _____

Cost Codes _____ Cost Codes _____

Health and Safety

Special Handling Instructions _____

Sales

Customer No. _____ Billing Codes _____ Comments: _____

APPENDIX D

STORM WATER POLLUTION PREVENTION PLAN

STORM WATER POLLUTION PREVENTION PLAN FOR CONSTRUCTION ACTIVITIES AT LANDFILL 2 FORT CARSON, COLORADO

Prepared for:
U.S. Army Corps of Engineers
Omaha District

Prepared by:
Rust Environment & Infrastructure
Englewood, Colorado

Rust Project No. 55253 WBS 743

January 1998

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FIGURE 1 **EROSION CONTROL PLAN**
ATTACHMENT A **INSPECTION AND MAINTENANCE REPORT FORM**

LIST OF ACRONYMS AND ABBREVIATIONS

CDPHE	Colorado Department of Public Health and Environment
EPA	Environmental Protection Agency
ET	Evapotransporation
NPDES	National Pollutant Discharge Elimination System
POL	Petroleum, Oil and Lubricants
RCRA	Resource Conservation and Recovery Act
Rust	Rust Environment & Infrastructure
SWMU	Solid Waste Management Unit
USAEHA	United States Army Environmental Hygiene Agency

D1.0 INTRODUCTION

This Storm Water Pollution Prevention Plan was prepared for the U.S. Army Corps of Engineers and Fort Carson to address the requirements of the National Pollutant Discharge Elimination System (NPDES) permit for storm water point source discharges associated with construction activities. The objectives of this plan are to limit the amount of pollution in storm water runoff from the construction site and minimize the generation of potential pollutants from construction activities. This plan describes and ensures the implementation of storm water measures and controls which will be used to reduce the pollutants in storm water discharges that have the potential to contribute significant contamination to waters of the United States.

Construction activities for Landfill 2 are detailed in the Gradefill and Cap Installation Work Plans. Cap installation will be performed to address Resource Conservation and Recovery Act (RCRA) closure of Landfill 2 and to minimize the generation of leachate at the landfill.

Landfill 2 and the planned construction activities were evaluated to determine if it contained potential pollutant sources which might reasonably be expected to add significant amounts of pollutants to storm water discharges. Based on this evaluation, potential sources were identified and include landfill material, construction related materials such as fuel and paints, construction waste generation, and activities such as decontamination and dust suppression. This plan addresses these potential sources and described the controls and measures that will be implemented to prevent storm water pollution.

This plan is consistent with the United States Environmental Protection Agency (EPA) guidance for Storm Water Management for Construction Activities (EPA, 1992). Section E2.0 provides site histories, description of the site, and details the construction activities. Section E3.0 describes the erosion and sediment controls and storm water management that will be implemented. Section E4.0 addresses state and local storm water requirements and Section E5.0 describes maintenance and inspection procedures. Section E6.0 discusses spill prevention including material management and spill control practices. Section E7.0 and E8.0 include the plan certifications.

D2.0 LANDFILL 2

This section provides a site description and history for Landfill 2. This section also provides a brief description of the construction activities that will be implemented at the site.

D2.1 LANDFILL 2 SITE DESCRIPTION AND HISTORY

The Cantonment Area is bounded on the northeast by Interstate Highway 25, on the north by the Fort Carson Reservation boundary, and on the east by Colorado State Road 115. The site facility pertaining to this project is Landfill 2 (FTC-006), which is located east of the Cantonment Area, SE 1/4, Sec 15, T15S, R66W. The site was reportedly operated between 1960 and 1978 as a combined trench and fill landfill. The trenches were supposedly oriented perpendicular to the topographic slope. The types of waste reportedly received at the site include mixed loads of sanitary wastes, sludges, and waste petroleum, oil, and lubricants (POL).

D2.2 CONSTRUCTION ACTIVITIES

Construction activities will include placement of an evapotransporation (ET) cap over Landfill 2. The ET cap is consistent with EPA requirements and will include a 3 to 5 foot cover. Prior to cap installation gradefilling will be conducted to move landfill material and achieve optimum slopes for drainage. Phase I of the gradefill operation consists of excavating 77,000 cubic yards of landfill material from areas north and east of the existing concrete channels. The material will be relocated to areas designated within Landfill 2 limits.

D3.0 CONTROLS

The following sections provide a description of the controls and measures that will be implemented at Landfill 2 to limit the amount of pollution from entering storm water during gradefill and construction activities. These measures include erosion and sediment controls and storm water management.

D3.1 EROSION AND SEDIMENT CONTROLS

Erosion and sediment controls are implemented prior to or during the construction activities to prevent and/or control the loss of soil from the site. These controls include stabilization measures for disturbed areas and structural controls to divert runoff and remove sediment.

Prior to actual earthwork at the sites, temporary erosion control materials shall be placed around the perimeter of the landfill as indicated in Figure 4-1. Erosion and sediment controls shall include silt fencing and will be inspected weekly and following any storm event of 0.5 inches or greater. Specific maintenance and inspection procedures are described in Section 5.0.

After the gradefill activities are completed at Landfill 2, disturbed areas outside the perimeter of the capping surface will be revegetated using native grasses as part of erosion protection activities. Erosion control materials, where needed, will be placed to promote seed establishment. Erosion control materials include vegetative mulching, erosion matting, silt fencing, straw or hay bales as defined by the seeding specification. Seeded areas will be protected against traffic or other use by erecting barricades and installing signs around the areas.

D3.2 STORM WATER MANAGEMENT

Soil berms will be constructed downgradient of the working face of the landfill to prevent storm water that has come into contact with municipal waste from leaving the site. Storm water collected at the berm locations from small storm events (less than the 100-year storm) will be allowed to evaporate or infiltrate. Storm water collected from large storm events (100-year storm) will be characterized and disposed accordingly.

After final grading is complete, the landfill caps and any borrow areas will be revegetated using native grasses. The seed mixes for caps and borrow areas have been selected incorporating various grass species that have root depths between 4 and 8 inches, can survive in dry climates, and require minimal maintenance. Seed mixtures and placement methods are described in the Construction Specifications for each landfill. Placement methods may include vegetative mulching or matting to promote seed establishment.

D3.3 OTHER CONTROLS

In addition to the controls and measures described above, additional actions or controls may be necessary to minimize the potential for pollutants contacting storm water. These controls include proper management of fuels, lubricants and other construction chemicals, proper management and disposal of construction waste, control of offsite vehicle tracking, and control of allowable non-storm water discharges.

D3.3.1 Fuel, Lubricants and Chemical Management

During activities fuel, lubricants, and miscellaneous chemicals such as paints and maintenance related materials will be used and stored on site. Fuel will be transported to the job site by a contracted fueling service, and the service will top off each vehicle on a daily basis. Paints, lubricants, oils and grease will be stored in a covered cabinet to prevent exposure to storm water.

D3.3.2 Waste Management

All construction related trash will be collected and stored in a securely covered metal dumpster. The dumpster will meet all State and local solid waste regulations. All trash from the sites will be deposited in the dumpster. The dumpster will be emptied a minimum of once per week or more often, if necessary, and the trash will be transported to an approved landfill. No construction waste materials will be buried onsite. All personnel will be trained on the correct procedure for waste disposal. Documents describing these practices will be available in the office trailer and the site manager will be responsible for seeing that these procedures are followed.

As landfill material is encountered during the excavation activities, it will be relocated within the landfill using backhoes and/or dump trucks. A 6-inch daily cover will be placed over areas of exposed municipal waste at the end of each day. Upon the completion of the excavation activities, a 12-inch intermediate soil cover will be placed over the areas of the landfill which municipal wastes were exposed or relocated. The daily cover and the intermediate soil covers will consist of imported fill material or landfill material which is free of municipal waste.

If potential hazardous wastes are encountered during construction activities, the material will be placed in closed containers, characterized, and transported offsite to an approved disposal facility. All containers including drums and rolloffs will be covered and labeled as the material is placed in them. All activities associated with hazardous waste generation shall comply with local and State regulations. All personnel will be trained on the correct procedure for waste identification and disposal.

All sanitary waste will be collected from the portable units a minimum of once per week by Fort Carson or its subcontractors.

D3.3.3 Offsite Vehicle Tracking

A stabilized construction entrance to the site shall be built to reduce vehicle tracking of sediments and generation of dust. A portable roll-through decontamination station with water will be established to remove any sediment or mud from truck tires and earth moving equipment leaving the construction site. The decon water will be contained and managed so that it is not discharged to storm water.

D3.3.4 Non-Storm Water Discharges

Water will be sprayed on site soils, as needed, to minimize dust generation during construction activities. Water will be used to suppress dust but will be applied sparingly to prevent the generation of runoff from the site.

D3.4 TIMING OF CONTROLS AND MEASURES

The sequence of major activities will be as follows:

1. Install stabilized construction entrance, perimeter, and other erosion and sediment controls. Erosion protection shall include silt fencing, straw bale sediment barriers and check dams.

2. Gradefilling and relocation of landfill materials.

3. Installation of the cap and final grade.

4. Revegetation

As indicated in the Sequence of Major Activities, the stabilized construction entrance, silt fencing, straw bale sediment barriers and check dams will be implemented prior to gradefill activities. Once the Phase I gradefilling operation is completed, the disturbed areas north and east of the concrete channels will be revegetated. In addition, once final grade is established, remaining disturbed areas will be vegetated. After the site is stabilized, and vegetation is established, the erosion controls and accumulated sediment will be removed.

D4.0 STATE AND LOCAL REQUIREMENTS

The State of Colorado does not regulate federal facilities with respect to the Clean Water Act; therefore, only federal regulations apply. However, all construction activities will be conducted consistent with both State and local requirements.

DE5.0 MAINTENANCE AND INSPECTION PROCEDURES

D5.1 EROSION AND SEDIMENT CONTROL INSPECTION AND MAINTENANCE PRACTICES

The inspection and maintenance practices will be conducted to maintain the erosion and sediment controls. The inspection and maintenance form is included in Appendix A. The inspection and maintenance practices are as follows:

- All control measures will be inspected at lease once each week and following any storm event of 0.5 inches or greater.
- All control measures will be maintained in good working order; if a repair in necessary, it will be initiated within 24 hours of identification and reporting.
- Build-up of sediment will be removed from the sediment trap when it has reached one-third the height of the straw bale or silt fence.
- Straw bales will be inspected for depth of sediment, and that bails are securely in place.
- The silt fence will be inspected to ensure that flow is not channeling under or around the fence and that the fence is secure.
- Permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth.
- A maintenance inspection report will be completed for each inspection. A copy of the report form is attached in Attachment A.
- The site manager will assign individuals who will be responsible for inspections; maintenance and repair activities; and completing the inspection and maintenance report.
- Personnel selected for inspection and maintenance responsibilities will receive training from the site manager. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used at the sites in good working order.

D5.2 NON-STORM WATER DISCHARGES

Non-storm water discharges are not anticipated to occur from the site during the construction period. Construction activities such as equipment fueling, maintenance, dust suppression, and equipment

decontamination will be conducted but discharges from these activities will be contained and properly managed as described in Section 3.0.

D6.0 SPILL PREVENTION

D6.1 INVENTORY

The materials or substances listed below are expected to be present onsite during construction:

- Petroleum Based Products (fuel, lubricants, grease, oil); and
- Paints.

D6.2 MATERIAL MANAGEMENT PRACTICES

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of material and substances to storm water runoff.

- Only enough product necessary to complete the job will be stored onsite;
- Onsite fuel storage will include secondary containment;
- All materials stored onsite .will be stored in a neat orderly manner in a cabinet or other covered location;
- Products will be kept in their original containers with the original manufacturers' label;
- Substances will not be mixed with one another unless recommended by the manufacturer;
- Whenever possible, all of a product will be used up before disposing of the container;
- Manufacturers' recommendations for proper use and disposal will be followed; and
- The site manager will inspect the site daily to ensure proper use and disposal of materials.

Hazardous Materials

The following practices will be used to reduce the risks associated with hazardous materials:

- Products will be kept in their original containers;
- Original labels and material safety data sheets will be retained and available onsite;
- If surplus product must be disposed, manufacturers' recommendations and State and local requirements for proper disposal will be followed: and
- Hazardous materials will be stored in a manner that minimizes the potential for spills, fire, or explosions.

D6.3 PRODUCT SPECIFIC PRACTICES

The following product specific practices will be followed onsite:

- Petroleum Products - All vehicles and equipment will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Drip pans will be used to

prevent any petroleum products from contacting the ground surface. Petroleum products will be stored in tightly sealed containers which are clearly labeled.

- Paints - All paint containers will be tightly sealed and stored in a secure location when not being used. Excess paint will be properly disposed according to the manufacturers' recommendations and State and local regulations.

D6.4 SPILL CONTROL PRACTICES

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup.

- Spill response procedures and actions described in the Task-Specific Environmental Protection Plan, Landfill 2 Cap Installation, Appendix B (Rust Environment & Infrastructure [Rust], June 1997);

- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials may include but will not limited to shovels, booms, rags, gloves, goggles, absorbent material, sand, sawdust, and plastic and metal trash containers specifically for this purpose; and

- Spills of toxic or hazardous material shall be reported to the site manager, Fort Carson and USACE to facilitate regulatory reporting if appropriate.

D7.0 POLLUTION PREVENTION PLAN CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____

Mr. Jim Henderson
Fort Carson

Date

D8.0 CONTRACTOR CERTIFICATION

I certify under penalty of law that I understand the terms and conditions of the general NPDES permit that authorizes the storm water discharge associated with the construction sites identified in this plan.

Signature	Company	Responsibilities
_____ *Name/Title* _____ *Date*	Rust Environment & Infrastructure 5575 DTC Parkway, Suite 200 Englewood, CO 80111	Construction Management
_____ *Name/Title* _____ *Date*	OHM Remedial Services 4897 Oakland St. Denver, CO 802339	Site Construction Activities

D9.0 REFERENCES

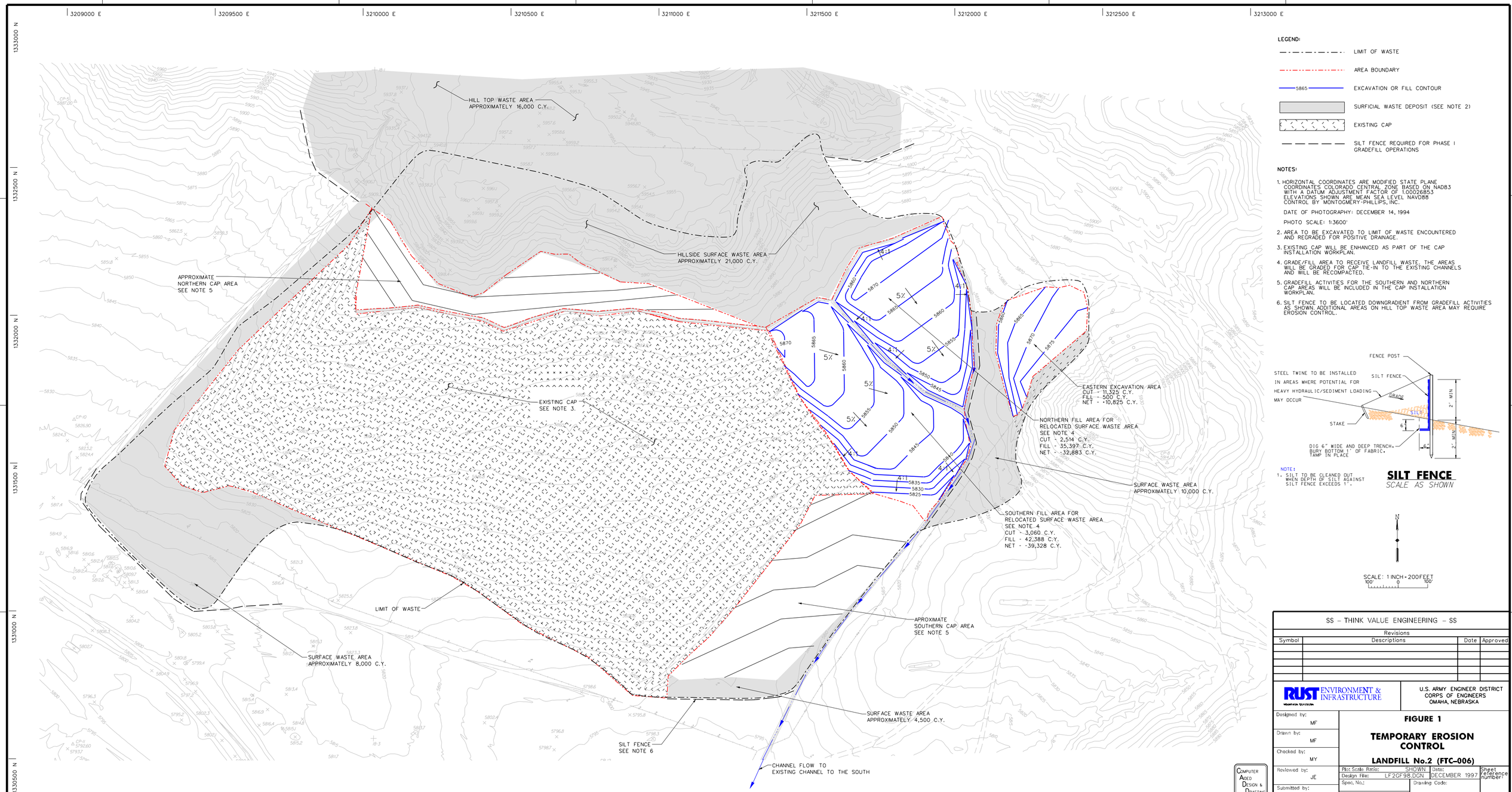
Environmental Protection Agency (EPA), Storm Water Management For Construction Activities, Developing Pollution Prevention Plans and Best Management Practices. EPA 833-R-92-001, October 1992.

Rust Environment & Infrastructure (Rust). June 1997. Task-Specific Environmental Protection Plan, Landfill 2 Cap Installation

U.S. Army Environmental Hygiene Agency (USAEHA) Geohydrologic Study (Phase 2 Geohydrologic Study #38-26-0392-87). August 1985.

USAEHA Groundwater Quality Study #38-26-0897-89, Investigation of Closed Landfills, June 1995.

FIGURES



LEGEND:

- LIMIT OF WASTE
- AREA BOUNDARY
- 5865 EXCAVATION OR FILL CONTOUR
- SURFICIAL WASTE DEPOSIT (SEE NOTE 2)
- EXISTING CAP
- SILT FENCE REQUIRED FOR PHASE I GRADEFILL OPERATIONS

NOTES:

1. HORIZONTAL COORDINATES ARE MODIFIED STATE PLANE COORDINATES COLORADO CENTRAL ZONE BASED ON NAD83 WITH A DATUM ADJUSTMENT FACTOR OF 1.00026853. ELEVATIONS SHOWN ARE MEAN SEA LEVEL NAVD88 CONTROL BY MONTGOMERY-PHILLIPS, INC.

   DATE OF PHOTOGRAPHY: DECEMBER 14, 1994

   PHOTO SCALE: 1:3600'
2. AREA TO BE EXCAVATED TO LIMIT OF WASTE ENCOUNTERED AND REGRADED FOR POSITIVE DRAINAGE.
3. EXISTING CAP WILL BE ENHANCED AS PART OF THE CAP INSTALLATION WORKPLAN.
4. GRADE/FILL AREA TO RECEIVE LANDFILL WASTE. THE AREAS WILL BE GRADED FOR CAP TIE-IN TO THE EXISTING CHANNELS AND WILL BE RECOMPACTED.
5. GRADEFILL ACTIVITIES FOR THE SOUTHERN AND NORTHERN CAP AREAS WILL BE INCLUDED IN THE CAP INSTALLATION WORKPLAN.
6. SILT FENCE TO BE LOCATED DOWNGRADIENT FROM GRADEFILL ACTIVITIES AS SHOWN. ADDITIONAL AREAS ON HILL TOP WASTE AREA MAY REQUIRE EROSION CONTROL.

NOTE:
1. SILT TO BE CLEANED OUT WHEN DEPTH OF SILT AGAINST SILT FENCE EXCEEDS 1'.

SILT FENCE
SCALE AS SHOWN

N

SCALE: 1 INCH = 200 FEET
100 0 100

CAD FILE: L:\WORK\29188\CAD\FTCARSON\LF2\LANDFL2\LF2GF98.DGN

COMPUTER AIDED DESIGN & DRAFTING

$$ – THINK VALUE ENGINEERING – $$

Revisions

Symbol	Descriptions	Date	Approved

RUST ENVIRONMENT & INFRASTRUCTURE

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

Designed by: MF	**FIGURE 1**
Drawn by: MF	**TEMPORARY EROSION CONTROL**
Checked by: MY	**LANDFILL No.2 (FTC-006)**
Reviewed by: JE	Plot Scale Ratio: SHOWN; Date: DECEMBER 1997; Sheet reference number:
Submitted by:	Design File: LF2GF98.DGN; Spec. No.: ; Drawing Code: ; Contract No.: DACW 45

ATTACHMENT A

INSPECTION AND MAINTENANCE REPORT FORM

STORM WATER POLLUTION PREVENTION PLAN

INSPECTION AND MAINTENANCE REPORT FORM

TO BE COMPLETED EVERY 7 DAYS AND WITHIN 24 HOURS OF
A RAINFALL EVENT OF 0.5 INCHES OR MORE

INSPECTOR: _____ DATE: _____

INSPECTOR'S QUALIFICATIONS:

_____

_____

_____

_____

DAYS SINCE LAST RAINFALL: _____ AMOUNT OF LAST RAINFALL: _____ INCHES

STABILIZATION MEASURES

AREA	DATE SINCE LAST DISTURBED	DATE OF NEXT DISTURBANCE	STABILIZED? (YES/NO)	STABILIZED WITH	CONDITION

STABILIZATION REQUIRED:

_____

_____

_____

_____

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

STORM WATER POLLUTION PREVENTION PLAN

INSPECTION AND MAINTENANCE REPORT FORM

SEDIMENT TRAPS

DEPTH OF SEDIMENT IN TRAPS	CONDITION OF TRAPS	ANY EVIDENCE OF DAMAGE TO TRAP	CONDITION OF OUTFALL FROM SEDIMENT TRAP

MAINTENANCE REQUIRED FOR SEDIMENT TRAP:

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

SILT FENCE

DEPTH OF SEDIMENT	CONDITION OF FENCE	ANY EVIDENCE OF OVERTOPPING OF SWALE?

MAINTENANCE REQUIRED FOR SILT FENCE:

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

STABILIZED CONSTRUCTION ENTRANCE:

DOES MUCH SEDIMENT GET TRACKED ON TO ROAD?	IS THE GRAVEL CLEAN OR IS IT FILLED WITH SEDIMENT?	DOES ALL TRAFFIC USE THE STABILIZED ENTRANCE TO LEAVE THE SITE?	IS THE CULVERT BENEATH THE ENTRANCE WORKING?

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

STORM WATER POLLUTION PREVENTION PLAN

INSPECTION AND MAINTENANCE REPORT FORM

CHANGES REQUIRED TO THE POLLUTION PREVENTION PLAN:

_____

_____

_____

_____

REASONS FOR CHANGES:

_____

_____

_____

_____

SIGNATURE: _____ DATE: _____

APPENDIX E

TASK-SPECIFIC QUALITY ASSURANCE/ QUALITY CONTROL PLAN LANDFILL 2 GRADEFILL

TASK-SPECIFIC QUALITY ASSURANCE/ QUALITY CONTROL PLAN LANDFILL 2 GRADEFILL FORT CARSON, COLORADO

Prepared for:
U.S. Army Corps of Engineers
Omaha District

Prepared by:
Rust Environment & Infrastructure
Englewood, Colorado

Rust Project No. 55253.000 WBS 743

January 1998

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E-1 Landfill 2 Gradefill Organization Plan

LIST OF ACRONYMS & ABBREVIATIONS

CQA	Construction Quality Assurance
DFW	Definable Features of Work
FLPM	Field and Laboratory Procedures Manual
Fort Carson	Fort Carson Military Installation
OHM	OHM Remediation Services Corp.
PM	Project Manager
QA	Quality Assurance
QC	Quality Control
QCSM	Quality Control System Manager
Quanterra	Quanterra Environmental Services
Rust	Rust Environment & Infrastructure
SQAM	Site Quality Assurance Manager
TERC 1	Total Environmental Restoration Contract 1
TM	Task Manager
USACE	U.S. Army Corps of Engineers

E1.0 PURPOSE AND SCOPE

Quality Assurance (QA)/Quality Control (QC) for the gradefill activities at Landfill 2 will be conducted in accordance with the Site-Wide Construction QA/QC Plan, supplemented with information in this Addendum, and Specification 01440, Contractor QC. The Site-Wide Construction QA/QC Plan has been prepared by Rust Environment & Infrastructure (Rust) for the U.S. Army Corps of Engineers (USACE)-Rocky Mountain Area Office to guide QA/QC tasks for all Total Environmental Restoration Contract 1 (TERC 1) Fort Carson Military Installation (Fort Carson) construction projects. Both the Site-Wide Construction QA/QC Plan and this Appendix will be implemented in its entirety to ensure:

- All Fort Carson project activities are performed in a manner consistent with the intent of approved drawings and specifications;
- All performance criteria are achieved; and
- The specified quality of work is maintained.

The Site-Wide Construction QA/QC Plan serves as the general QA/QC guidance document for all remedial action operations to be accomplished at Fort Carson under the Rust TERC 1 Contract. This Appendix is written to include considerations specific to the requirements of the gradefill activities at Landfill 2.

QC is the overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet established requirements. Effective QC will benefit the contractor, subcontractors, the USACE, and Fort Carson by reducing deficiencies and the need for corrective actions, resulting in reduction of costs and adherence to project schedules. QC is the complete responsibility of Rust and delegated subcontractor personnel. Duties of QC include generation of the Daily Quality Control Report, generation of site photographs, oversight of definable features of work (DFW) utilizing the three phases of control, review, and approval of subcontractor submittals and overall site activity documentation.

E2.0 QUALITY ASSURANCE/QUALITY CONTROL PLAN ORGANIZATION

Creating a work environment in which all project entities work together to produce the type and quality of results that are expected is the responsibility of all personnel. This includes site personnel from all organizations: Rust and Rust Subcontractors; Fort Carson; and the USACE. The organization of the project (Figure 1) outlines a structure that includes overall contract management by Rust; onsite construction management; health and safety and earthwork by OHM Remediation Services Corp. (OHM); waste identification during gradefill activities by Rust; and subcontractors for analytical services and solid and hazardous waste disposal. With this organization, OHM conducts the majority of field work with Rust providing overall direction and characterization coordination. Rust also provides a liaison with OHM and USACE in approving recommended waste disposition, and in receipt and maintenance of analytical results from the laboratory, Quanterra Environmental Services (Quanterra). In addition, Rust provides technical and graphical support in data presentation and preparation of the final project report. Rust anticipates that the following personnel will serve in specific QA/QC roles for the implementation of the gradefill activities for Landfill 2.

Mr. John England (Rust)	Project Manager (PM)
Mr. Scott Olson (Rust)	Task Manager (TM)
Mr. Rick Jennings (Rust)	Site QA Manager (SQAM)
Mr. Michael Finochio (Rust)	Alternate SQAM or QCSM
Mr. Vien Perez (OHM)	QC System Manager (QCSM)
Mr. Dave Best (OHM)	Project Accountant
Mr. Martin Rasmussen (USACE)	Government QA Manager
Mr. Cory Oldweiler (G.E.S.)	Certifying Engineer

As PM, Mr. John England has responsibility for overall quality of work performed at Fort Carson by the Rust Team under the TERC 1 Contract. Mr. England, in the role of PM, has overall responsibility for verifying that all project participants properly implement the demolition/renovation related tasks in accordance with the Work Plan. Changes to the project scope, or approach to implementation of the Work Plan brought on by differing site conditions or refinements to the task approach, will be approved for the Rust Team through Mr. England. Mr. England will also serve as the primary point of contact for all issues involving USACE or Fort Carson. The PM will be responsible for overall

management and coordination of project-related engineering and construction activities and the execution of the Site-Wide Construction QA/QC Plan, but will be assisted by the TM, Mr. Scott Olson. Mr. England will issue a Serial Letter to the USACE-Area Office which describes the responsibilities and authorities of the SQAM and QCSM, respectively, and which delegates said authority.

Mr. Rick Jennings is responsible for the development, implementation, and compliance of the QA program for the entire scope of work administered by Rust, whether performed by Rust or subcontractors, under the TERC 1 Contract. As such, he will coordinate QA policy for Rust activities at Fort Carson, and evaluate the QA policy impacts to construction tasks, as well as the overall TERC 1 program at Fort Carson. Mr. Jennings, in the role of SQAM, is responsible for onsite project QA on a daily basis, and for communication with the Fort Carson Environmental office. This mainly entails the responsibility to monitor, oversee, and direct the daily QC activity. He will document this responsibility through the review and acknowledgment of the Daily Contractor QC Report. Mr. Jennings will also act in a support role for the Rust Team in that he is responsible for contact with all Fort Carson support entities such as facilities, fire, and security. Mr. Jennings will assist OHM and subcontractors in the coordination and implementation of waste tracking as described in the Fort Carson Field and Laboratory Procedures Manual (FLPM) (Rust, April 1997).

The OHM Project Engineer, Mr. Vien Perez, in the role of QCSM, is responsible for ensuring that day-to-day tasks are performed according to approved project specifications and procedures. The QCSM's daily activities will include assimilation of data for, and preparation of, the Contractor Daily QC Report, coordination and control of soil sampling efforts, and coordination of the tracking and control of all offsite waste shipments in accordance with the Fort Carson FLPM. The QCSM will also implement and take the lead role in promoting and enforcing QC to all project subcontractors, as well as coordinate all project inspections in accordance with criteria established by the overall Rust Team.

The Project Accountant, Mr. Dave Best of OHM, is responsible for maintaining the inventory of all government property used during the gradefill activities.

Rust has designated Mr. Michael Finochio as an alternate resource for either SQAM or QCSM in the event of absence.

Mr. Martin Rasmussen of the USACE-Area Office, Colorado Springs, Colorado, will act as the QA representative for the United States Government, and will have ultimate authority for all quality related issues and decisions during the course of the project. Mr. Rasmussen will be known as the Government QA Manager. Coordination of all QA issues will be addressed to Mr. Rasmussen through Mr. John England, and as delegated to Scott Olson.

Mr. Cory Oldweiler of Global Environmental Services Inc. will serve as the Certifying Engineer for the project. Mr. Oldweiler is a Professional Engineer certified in the state of Colorado. The Certifying Engineer will report to the Rust Project Manager and may assist in directing the efforts of the SQAM and Construction Quality Assurance (CQA) staff. The principal responsibilities of the Certifying Engineer are to:

- Review the project drawings and specifications prior commencement of construction activities;
- Review CQA testing results and CQA staff observations, and verify through periodic personal observations that the construction work is being performed appropriately; and
- Review the certification report prepared by the SQAM, and sign and seal the report certifying that the construction work was performed in compliance with the approved drawings and specifications.

It is anticipated that one certification report will be prepared and will include both gradefill and cap construction activities. A separate certification report will not be prepared for gradefill activities alone.

E3.0 DEFINABLE FEATURES OF WORK AND PHASE MEETINGS

The DFW for implementation of the gradefill activities at Landfill 2 is the consolidation and grading of landfill material in accordance with the drawings and specifications. The phases of control: Preparatory; Initial; and Follow-Up shall be followed for each DFW. All phases shall be documented in the Daily QC Report as they occur. All phase meetings shall be conducted by the QCSM and attended by other QC personnel (as applicable), the Site QA Manager, and the foremen responsible for the definable feature. Phase meetings shall be documented by the QCSM and attached to the Daily QC Report.

Preparatory meetings will be required prior to mobilization to the site. The preparatory meeting shall be held within five days from issuance of the Notice to Proceed. The purpose of the meeting is to establish the work plan and identify all requirements of the contractor. Guidelines for the preparatory Phase is outlined in Section 4.1 of the Site-Wide Construction QA/QC Plan.

E4.0 INITIAL AND FOLLOW-UP FEATURES OF WORK

The Initial Phase consists of a review of work practices and procedures and must be accomplished at the commencement of the DFW field activity. Accomplishments of this Initial Phase are indicated in Section 4.2 of the Site-Wide Construction QA/QC Plan.

The Follow-Up Phase is the continued inspection of practices and procedures for the remainder of site activities for that DFW. Daily checks shall be performed to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work, as indicated in Section 4.3 of the Site-Wide Construction QA/QC Plan.

E5.0 CHANGED CONDITIONS/CHANGE NOTICES

All members of the overall Rust Team recognize the potential of project scope or site conditions changing during the execution of environmental restoration projects. All changes shall be handled by a consensus approach by the Rust Team, and will be thoroughly discussed at the Weekly DO19 Status Meeting.

E6.0 SUBMITTALS AND DELIVERABLES

Subcontractors shall be responsible for their own QC reporting including documentation of personnel, hours worked, all activities and progress, equipment onsite, and any problems or issues encountered; however, subcontractors are not anticipated during gradefill activities. Each subcontractor shall prepare a Daily Subcontractor QC Report to submit to the QCSM. Daily Subcontractor QC Reports will be appended to the Contractor Daily QC Report. The day's report shall be submitted by the following morning. Issues of concern will be routed through Rust to USACE and Fort Carson. A copy of the USACE Daily QC Report is attached in Specification 01440 in Appendix B of the Site-Wide Construction QA/QC Plan.

Daily Health and Safety report forms will also not be considered a formal submittal item, and will be attached to the Daily QC Reports as well.

In accordance with the DO19 Scope of Services, a Construction Completion Report will be prepared following the installation of a cap at Landfill 2 documenting that the completed project was consistent with the Work Plan and Specifications. A separate Construction Completion Report will not be prepared to document gradefill activities. The Construction Completion Report shall be submitted to USACE once the construction has been completed. The Construction Completion Report shall, at a minimum, include the elements described in Section 16.0 of the Site-Wide Construction QA/QC Plan.

E7.0 TESTS AND SAMPLE COLLECTION

All testing will follow recognized and accepted testing methods and standards as described in Section 9.0 of the Site-Wide Construction QA/QC Plan. It is not anticipated that laboratory geotechnical testing will be required during gradefill activities to define borrow areas. Proof rolling as defined in the Specifications (Appendix F) will be conducted on areas of relocated soils.

E7.1 CHEMICAL ANALYSES

If required, sampling and analytical for characterization of soils for offsite disposal will be conducted. These characterization samples will be collected by Rust as part of waste identification and analyzed in accordance with the FLPM (Rust, April 1997). The FLPM will be referenced for specific analytical testing methods and data validation processes.

Analytical results from the characterization and confirmation sampling effort will be reviewed by Rust for adequacy, accuracy, and acceptance, prior to presentation at any mandated Colorado Department of Public Health and Environment coordination and review meetings.

E8.0 WASTE STREAM CHARACTERIZATION AND TRACKING

The requirements for waste stream characterization and tracking are described in the FLPM and the Landfill 2 Grading Implementation Work Plan. Characterization samples will be collected according to the frequencies, methods, and additional parameters described in these plans.

Waste stream characterization and tracking is a critical component of this project. Rust will designate sample numbers, prepare chain of custody paperwork, collect the samples, and arrange for sample shipment to the laboratory.

Samples will be sent to Quanterra, a pre-qualified TERC-approved laboratory. An annual review of laboratory performance, and a facility inspection, is provided by the USACE-Omaha.

Rust will receive the data from the laboratory, validate the adequacy, accuracy, and acceptance of the data, and OHM and Rust will make a recommendation for disposal. Data certification and disposal recommendations will be determined according to procedures outlined in the Site-Wide Construction QA/QC Plan. The recommendation will be forwarded to Fort Carson for concurrence. The manifest package for waste soils will be prepared and approved through USACE-Omaha and signed by Fort Carson. Rust will contract for shipment of the waste or will coordinate disposal of the waste through Fort Carson Directorate of Compliance and Management.

Final approval and authority for waste treatment or disposal will be the responsibility of Fort Carson or will coordinate disposal of the waste through Fort Carson Directorate of Compliance and Management.

E9.0 GOVERNMENT PROPERTY INVENTORY

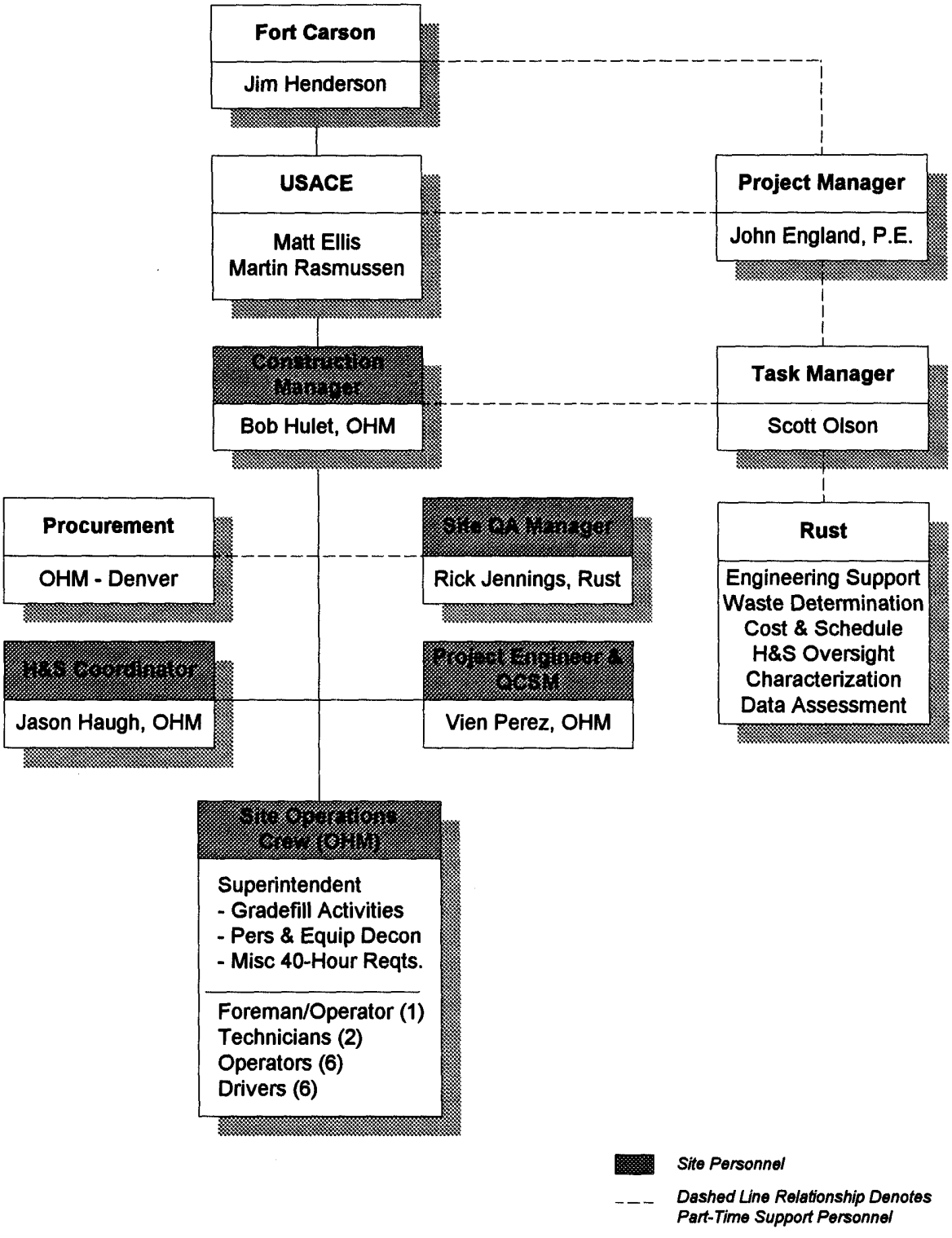
Rust acknowledges and accepts the responsibility and accountability for all government property in the possession or control of Rust or Rust's subcontractors. The OHM Project Accountant is responsible for keeping inventory of all government property used during the project. Accountable property includes property that costs more than $25.00 and is not expendable. Accountable property will be labeled and inventoried monthly. Government owned property can include office equipment, health and safety property, or field operations property. A final inventory of government property will be compiled at the completion of the project and submitted to the Government QA Manager. Appendix C of the Site-Wide Construction QA/QC Plan contains the Property Management and Inventory Control Plan for construction tasks performed by Rust at the Fort Carson.

E10.0 REFERENCES

Rust Environment & Infrastructure (Rust). April 1997. Field and Laboratory Procedures Manual.

FIGURES

FIGURE E-1
LANDFILL 2 GRADEFILL
ORGANIZATION PLAN



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APPENDIX F

SPECIFICATIONS

DIVISION 1
GENERAL REQUIREMENTS

SPECIFICATIONS OF CONSTRUCTION
LANDFILL 2 - GRADEFILL

DIVISION 1 - GENERAL REQUIREMENTS

01050	Construction Staking
01190	Progress Meetings
01200	Warranty of Construction
01300	Submittal Descriptions
01305	Submittal Procedures
01320	Construction Photographs
01401	Safety, Health, and Emergency Response
01405	Temporary Fire Protection
01430	Environmental Protection
01440	Contractor Quality Control
01500	Temporary Construction Facilities
01702	Contract Closeout
01720	Project Record Documents
01900	Material, Vehicle, and Equipment Decontamination

DIVISION 2 - SITEWORK

02110	Site Preparation
02222	Mass Excavation and Final Cap Subgrade Preparation
02253	Gas Monitoring Probes
02720	Contaminated Liquids Removal
02930	General Seeding

SECTION 01050

CONSTRUCTION STAKING

PART 1 GENERAL

1.1 SUMMARY

1.1.1 SUBCONTRACTOR Responsibilities

a. Vertical and horizontal control shall be established by SUBCONTRACTOR in the form of bench marks prior to starting earth work at the project site. All construction staking shall be the responsibility of SUBCONTRACTOR. In addition, SUBCONTRACTOR shall be responsible to review all construction staking with CONTRACTOR'S CQA representative to identify the features staked.

b. SUBCONTRACTOR will perform survey for certification. This work shall include:

1. Survey excavation and fill (top of final cap subgrade) surfaces
2. Survey top of final cap layer to ensure the minimum thickness of material has been placed.
3. Survey top of drainage and road base gravel layers to ensure the minimum thickness of material has been placed.

SUBCONTRACTOR shall provide the survey information to CONTRACTOR and assist with clarification of survey items as requested by CONTRACTOR to aid in interpretation of survey data to assist CONTRACTOR in preparation of Record Drawings for the certification report.

c. Survey work shall be performed by a Professional Land Surveyor registered in the State of Colorado.

1.1.2 Primary Control Monuments

Bench marks shall be established by SUBCONTRACTOR to establish primary vertical and horizontal control for Work.

1.2 SUBMITTALS

The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-01 DATA\.

1. Computations for control stations and bench marks.
2. Field notes.
3. Survey data.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 BENCH MARKS

A minimum of three permanent horizontal/vertical control monuments shall be established at each landfill site. Each monument shall be assigned 3rd order State Plane coordinates and Mean Sea Level elevations. Horizontal and vertical control must be independently verified. The control monuments shall be established outside of the area of proposed

construction on stable ground and the points shall be intervisible. Bench mark locations shall be approved CONTRACTOR. A first-order geodetic monument is present at the Post.

3.1.1 Bench Mark Construction

Each control monument shall be constructed by advancing a 6-inch diameter borehole to a depth of 4.5 feet and driving a 1-inch diameter by 8-foot long steel rod through the bottom of the borehole to a total depth of approximately 7.5 feet. A 5-foot long, thick-walled, 4-inch diameter steel casing shall then be set to the bottom of the borehole and the annular space inside and around the casing shall be filled with concrete. Monuments shall be constructed to protrude approximately 6 inches above the surrounding ground surface. Each monument shall be completed with a standard 4-inch diameter bronze survey disc set into the masonry. Monuments shall be stamped with an identification mark approved by the CONTRACTOR.

Descriptions showing at least three ties to all monuments set in the field and approximate directions and measured distances shown on a drawing shall be provided. If field features are not available for ties, then witness posts shall be set.

3.1.2 Accuracy

The project control survey shall meet or exceed the horizontal and vertical accuracy criteria as defined by the Standards and Accuracy and General Specifications of Geodetic Control Surveys established by the U.S. Department of Commerce. Horizontal control positions shall be within Third Order, Class I accuracy and accomplished by those standards. The closing error of control leveling for the survey/monuments shall not exceed 0.05 foot times the square of M, where M is the miles of leveling. Computations for all control stations and bench marks shall be furnished to the CONTRACTOR.

3.2 CONSTRUCTION LINE AND GRADE

SUBCONTRACTOR shall bear sole responsibility for correct transfer of construction lines and grades from bench marks for the correct alignment and grade of completed Work based on lines and grades shown on Drawings. SUBCONTRACTOR shall establish vertical and horizontal reference control stakes in the proximity of the work as follows:

3.2.1 Datum for Control

Horizontal coordinates shall be based on Modified State Plane Coordinates, Colorado Control Zone, based on NAD 83 (adjustment factor 1.00026853). Elevations shall be based on Mean Sea Level NAV 88.

3.2.2 Excavation and fill to reach final cap subgrade:

a. Elevations shall be taken on existing ground on 100 foot grid and breaks per the Drawings prior to construction, to be used as reference data for verification of record quantities.

b. Rough cut/fill stakes on a 100 foot grid shall be set for the final cap subgrade when SUBCONTRACTOR starts construction or when SUBCONTRACTOR is close to grade. No stakes shall be placed within the limits of the geomembrane or the geotextiles, where applicable. Alternately, SUBCONTRACTOR may use laser guided equipment.

c. Cut/fill stakes shall be set on a 100 foot grid for finished grading of the final cap subgrade. Alternately, SUBCONTRACTOR may use laser guided equipment.

d. Certification surveying shall be on a 100 foot grid, along breaks, and along significant structures per the Drawings (such as top or toe of slopes, edge of cap, ditches, roads, etc.).

3.2.3 Data Transfer

SUBCONTRACTOR shall provide a copy of field notes in a neat and legible format to CONTRACTOR at the end of the day upon which the survey is performed. In addition, at least once per each week survey work is performed, a copy of the survey data shall be submitted on a high density, 1.44 MB, 3.5" diskette, in a standard ASCII file format. Coordinates should be input as decimal numbers in columns for point ID, northing, easting and elevation. All columns shall be separated by blanks, tabs, or commas.

3.3 SURVEY MONUMENTS

SUBCONTRACTOR shall protect survey monuments marked by CONTRACTOR existing throughout Project area. If monuments are damaged, the SUBCONTRACTOR shall advise CONTRACTOR immediately. SUBCONTRACTOR shall replace damaged monuments by a Registered Land Surveyor at SUBCONTRACTOR'S expense.

SECTION 01190

PROGRESS MEETINGS

PART 1 GENERAL

1.1 SUMMARY

This section covers the required progress meetings which will be held at the project site.

1.2 GENERAL REQUIREMENTS

CONTRACTOR shall administer the following general requirements:

a. Prepare agenda for meetings
b. Make physical arrangements for meetings
c. Preside at meetings
d. Record the minutes; include significant proceedings and decisions
e. Reproduce and distribute copies of minutes within three days after each meeting to meeting participants and to parties affected by decisions made at the meeting. Furnish three copies of the minutes to the CONTRACTOR.

1.3 ATTENDANCE

Suggested attendance for the progress meetings includes but is not limited to the following:

a. CONTRACTOR'S Project Manager
b. CONTRACTOR'S Site Quality Assurance Manager
c. SUBCONTRACTOR'S Project Manager
d. SUBCONTRACTOR'S Quality Control Systems Manager
e. SUBCONTRACTOR'S Industrial Hygiene Technician
f. SUBCONTRACTORS as appropriate to the agenda
g. Suppliers as appropriate to the agenda
h. Others as appropriate

1.4 SUGGESTED AGENDA

The suggested agenda items for the progress meetings include but are not limited to the following:

a. Review and approval of minutes of previous meeting
b. Review of progress since previous meeting
c. Field observations, problems, conflicts
d. Problems which impede construction schedule and proposed corrective actions
e. Review of off-site delivery schedules
f. Corrective measures and procedures to regain projected schedule
g. Revisions to construction schedule
h. Projected progress during succeeding work period
i. Coordination of schedules
j. Review submittal schedules; expedite as required
k. Maintenance of quality and safety standards
l. Changes and substitutions
m. Review proposed changes for effect on construction schedule and on completion date, and effect on other contracts of the project
n. Other business as appropriate

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 MINIMUM REQUIREMENTS

CONTRACTOR shall schedule and administer at least two progress meetings per month and such additional meetings as necessary to meet project needs. These meetings shall be held at the project site.

SECTION 01200

WARRANTY OF CONSTRUCTION

PART 1 WARRANTY OF CONSTRUCTION

1.1 Foremost and in addition to any other warranties in this contract, the SUBCONTRACTOR warrants, except as provided in paragraph 1.10 of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, design furnished, or workmanship performed by the SUBCONTRACTOR or any SUBCONTRACTOR or supplier at any tier.

1.2 WARRANTY DURATION

1.2.1 The warranty for the Fort Carson Landfill 2 Gradefill shall extend for 1 year from the date of acceptance by the Government.

1.2.2 The warranty for site reconstruction work shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall commence for that part on the date of possession and continue for a period of 1 year.

1.3 The SUBCONTRACTOR shall remedy at the SUBCONTRACTOR'S expense any failure to conform, or any defect. In addition, the SUBCONTRACTOR shall remedy, at the SUBCONTRACTOR'S expense, any damage to Government-owned or controlled real or personal property, when that damage is the result of-

a. The SUBCONTRACTOR'S failure to conform to contract requirements; or

b. Any defect of equipment, material, workmanship, or design furnished by the SUBCONTRACTOR.

1.4 The SUBCONTRACTOR shall restore any work damaged in fulfilling the terms and conditions of this clause.

1.5 The SUBCONTRACTOR'S warranty with respect to work restored, repaired or replaced will run for 1 year from the date of restoration, repair or replacement. This provision applies equally to all items restored, repaired, or replaced under paragraph 1.3 and 1.4 above.

1.6 The CONTRACTOR will notify the SUBCONTRACTOR, in writing, within a reasonable time after the discovery of any failure, defect, or damage. Repair work necessary to correct a warranty condition which arises to threaten the health or safety of personnel, the physical safety of property or equipment, or which impairs operations, habitability of living spaces, etc., will be performed by the SUBCONTRACTOR on an immediate basis as directed verbally by the CONTRACTOR. Written verification will follow verbal instruction.

1.7 Failure of the SUBCONTRACTOR to respond as verbally directed will be cause for the CONTRACTOR to have the warranty repair work performed by others and to proceed against the SUBCONTRACTOR as outlined in the paragraph 2.1.1. If the SUBCONTRACTOR fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the CONTRACTOR shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the SUBCONTRACTOR'S expense, as outlined in paragraph 2.1.1.

1.8 With respect to all warranties, express or implied, from SUBCONTRACTORS, manufacturers, or suppliers for work performed and materials furnished under this contract, the SUBCONTRACTOR shall-

a. Obtain all warranties that would be given in normal commercial practice;

b. Require all warranties to be executed, in writing, for the benefit of the Government.

1.9 Unless a defect is caused by the negligence of the SUBCONTRACTOR or supplier/SUBCONTRACTOR at any tier, the SUBCONTRACTOR shall not be liable for the repair of any defects of material or design furnished by the CONTRACTOR nor for the repair of any damage that results from any defect in CONTRACTOR-furnished material or design.

1.10 This warranty shall not limit the CONTRACTOR'S right under the contract with respect to latent defect, gross mistakes, or fraud.

PART 2 ADDITIONAL WARRANTY REQUIREMENTS

2.1 PERFORMANCE

2.1.1 If either the SUBCONTRACTOR or his representative doesn't diligently pursue warranty work to completion, the SUBCONTRACTOR and his surety will be liable for all costs. The CONTRACTOR, at its option, will either have the work performed by others or require the surety to have it done. Both direct and administrative costs will be reimbursable to the CONTRACTOR.

2.2 PRE-WARRANTY CONFERENCE

2.2.1 Prior to contract completion and at a time designated by the CONTRACTOR, the SUBCONTRACTOR shall meet with the CONTRACTOR to develop a mutual understanding with respect to the requirements of the Paragraph: WARRANTY OF CONSTRUCTION. Communication procedures for SUBCONTRACTOR notification of warranty defects, priorities with respect to the type of defect and other details deemed necessary by the CONTRACTOR for the execution of the construction warranty shall be established/reviewed at this meeting.

2.2.2 In connection with these requirements and at the time of the SUBCONTRACTOR'S quality control completion inspection, the SUBCONTRACTOR will furnish the name, telephone number and address of the *service representative*\ which is authorized to initiate and pursue warranty work action on behalf of the SUBCONTRACTOR and surety. This single point of contact will be located within the local service area of the warranted construction, will be continuously available, and will be responsive to CONTRACTOR inquiry on warranty work action and status. This requirement does not relieve the SUBCONTRACTOR of any Contractual responsibilities in connection with the paragraph: WARRANTY OF CONSTRUCTION.

2.2.3 Local service area is defined as the area in which the SUBCONTRACTOR or his representative can meet the response times as described in paragraph 2.3 and in any event shall not exceed 200 miles radius of the construction site.

2.3 WARRANTY SERVICE CALLS

The SUBCONTRACTOR will respond to the site within twenty-four (24) hours of a call from the site.

PART 3 SUBMITTALS

CONTRACTOR approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300:

SD-01 Data\

Service Representative\

Names of service representatives that will make warranty calls along with the day, night, weekend and holiday contacts for response to a call within the time period specified.

SECTION 01300

SUBMITTAL DESCRIPTIONS

PART 1 GENERAL

1.1 SUBMITTALS

The submittals described below are those required and further described in other sections of the specifications. Other requirements pertaining to submittals are included in the SPECIAL CLAUSES and Section 01305 SUBMITTAL PROCEDURES. Submittals required by the CONTRACT CLAUSES and other nontechnical parts of the contract are not included in this section.

SD-01 Data\

Submittals which provide calculations, descriptions, or documentation regarding the work.

SD-04 Drawings\

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, details of fabrication, layouts of particular elements, connections, and other relational aspects of the work.

SD-06 Instructions\

Preprinted material describing installation of a product, system or material, including special notices and material safety data sheets, if any, concerning impedances, hazards, and safety precautions.

SD-07 Schedules\

Tabular lists showing location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

SD-08 Statements\

A document, required of the Vendor, or through the Vendor, from a supplier, installer, manufacturer, or other lower tier Vendor, the purpose of which is to confirm the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verifications of quality.

SD-09 Reports\

Reports of inspections or tests, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used shall be identified and test results shall be recorded.

SD-13 Certificates\

Statement signed by an official authorized to certify on behalf of the manufacturer of a product, system or material, attesting that the product, system or material meets specified requirements. The statement must be dated after the award of this contract, must state the Vendor's name and address, must name the project and location, and must list the specific requirements which are being certified.

SD-14 Samples\

Samples, including both fabricated and unfabricated physical examples of materials, products, and units of work as complete units or as portions of units of work.

SD-18 Records\

Documentation to record compliance with technical or administrative requirements.

SD-19 Operation and Maintenance Manuals\

Data which forms a part of an operation and maintenance manual.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

SECTION 01305

SUBMITTAL PROCEDURES

ATTACHMENTS: Submittal Register (ENG Form 4288)
Transmittal Form (ENG Form 4025)

PART 1 GENERAL

1.1 SUMMARY (Not Applicable)

1.2 REFERENCES (Not Applicable)

1.3 RESPONSIBILITIES

1.3.1 SUBCONTRACTOR and CONTRACTOR Responsibilities

The SUBCONTRACTOR is responsible for management of his work including scheduling, control, and submittals. The submittal management system provided in these specifications is intended to be a complete system for the CONTRACTOR and SUBCONTRACTOR to use to control the quality of materials, equipment and workmanship provided by manufacturers, fabricators, suppliers and SUBCONTRACTORS. The CONTRACTOR and SUBCONTRACTOR shall review each submittal for contract compliance. Submittals that do not conform will be returned to the originator to be corrected. The Submittal Register (ENG Form 4288) will be utilized to log and monitor all submittal activities. No construction or installation activities shall be performed prior to required approvals of applicable submittals. The SUBCONTRACTOR shall perform a check to ensure that all materials and/or equipment have been tested, submitted and approved during the preparatory phase of quality control inspections.

1.3.2 CONTRACTOR Responsibilities

The CONTRACTOR will prepare a list of submittals required for each contract. This list will be prepared on ENG Form 4288 (Submittal Register) and will be limited to columns "c" through "o". The CONTRACTOR will review submittals for approval and approve those that conform to contract requirements. The approval of submittals by the CONTRACTOR shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the SUBCONTRACTOR of the responsibility for any error which may exist, as the SUBCONTRACTOR under the CQC requirements of this contract is responsible for the dimensions and design of adequate connections, details and satisfactory construction of all work. After submittals have been approved, no resubmittal for the purpose of substituting materials or equipment will be given consideration unless accompanied by justification as to why a substitution is necessary.

1.4 SUBMITTAL CLASSIFICATION (Not Used)

1.5 CATEGORIES OF SUBMITTALS (Not Used)

1.6 DISAPPROVED SUBMITTALS

The SUBCONTRACTOR shall make all corrections required by the CONTRACTOR and promptly furnish a corrected submittal in the form and number of copies as specified for the initial submittal. The SUBCONTRACTOR shall examine his quality control plan and organization to determine why his controls did not identify the deficiency. Appropriate adjustments will be made in the quality control program and/or implementation. If the SUBCONTRACTOR considers any correction indicated on the submittals to constitute a change to the contract, notice as required under the Contract Clause entitled "Changes" shall be given promptly to the CONTRACTOR.

1.7 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required submittals/approvals have not been obtained.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The SUBCONTRACTOR shall submit all items listed on the Submittal Register (ENG Form 4288) or specified in the other sections of these specifications. The CONTRACTOR may request submittals in addition to those listed when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same used in the contract drawings. Submittals shall be made in the respective number of copies and to the respective addresses set forth below. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with all contract requirements. Prior to submittal, all items shall be checked and approved by the SUBCONTRACTOR'S Quality Control (CQC) representative and each respective transmittal form (ENG Form 4025) shall be stamped, signed, and dated by the CQC representative certifying that the accompanying submittal complies with all the contract requirements. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: SUBCONTRACTOR'S, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals including parts list; certifications; warranties and other such required submittals. Submittals requiring approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby.

3.2 SUBMITTAL REGISTER (ENG Form 4288)

The SUBCONTRACTOR will be furnished one (1) set of ENG Forms 4288 at the preconstruction conference on which will be listed each item of equipment and material of each type for which fabricators drawings, and/or related descriptive data, test reports, samples, spare parts lists, O&M manuals, or other types of submittals are required by the specifications. Columns "c" thru "o" will be completed by the CONTRACTOR. The SUBCONTRACTOR shall complete columns "a," and "q" thru "s" and return three (3) completed copies to the CONTRACTOR for approval within twenty (20) calendar days after the preconstruction conference. Column b shall be left blank for use later to record the respective transmittal and item number corresponding to those listed on the transmittal form entitled: "TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE" (ENG Form 4025). The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. This register and the progress schedules shall be coordinated.

3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of twenty (20) calendar days exclusive of mailing time) shall be allowed on the register for review and approval. No delays, damages, or time extensions will be allowed for time lost in late submittals.

3.4 TRANSMITTAL FORM (ENG Form 4025)

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the SUB-CONTRACTOR. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care will be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

3.5 SUBMITTAL PROCEDURE

All items listed on the Submittal Register shall be mailed directly to the CONTRACTOR. The mailing address shall be obtained from the CONTRACTOR at the preconstruction conference.

Each required submittal which is in the form of a drawing shall be submitted as one (1) reproducible and one (1) print of the drawing. Drawing prints shall be either blue or black line permanent-type prints on a white background or blueprint. Reproducibles shall be brownline diazo or sepia and shall be of such quality that prints made therefrom are sufficiently clear for microfilm copying.

All catalog and descriptive data shall be submitted in three (3) copies. Catalog cuts and other descriptive data which have more than one model, size, or type or which shows optional equipment shall be clearly marked to show the model, size, or type and all optional equipment which is proposed for approval. Submittals on component items forming a system or that are interrelated shall be submitted at one time as a single submittal in order to demonstrate that the items have been properly coordinated and will function as a unit.

3.5.1 Certificates of Compliance

Each certificate shall be signed by an official authorized to certify in behalf of the manufacturing company and shall contain the name and address of the SUBCONTRACTOR, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the SUBCONTRACTOR from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

3.5.2 Deviations

For submittals which include proposed deviations requested by the SUBCONTRACTOR, the column "variation" of ENG Form 4025 shall be checked. The SUBCONTRACTOR shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The CONTRACTOR reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

3.6 CONTROL OF SUBMITTALS

The SUBCONTRACTOR shall carefully control his procurement operations to ensure that each individual submittal is made on or before the SUBCONTRACTOR scheduled submittal date shown on the approved "Submittal Register."

3.7 CONTRACTOR APPROVED SUBMITTALS

Upon completion of review of submittals, the submittals will be identified as having received approval by being so stamped and dated.

The drawing print and three (3) sets of all catalog data and descriptive literature will be retained by the CONTRACTOR. Copies of the submittals for approval, drawings, catalog data and descriptive literature will be returned to the SUBCONTRACTOR.

3.8 STAMPS

Stamps used by the CONTRACTOR on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR

(Firm Name)

_____ Approved

_____ Approved with corrections as noted on submittal data and/or attached sheets(s).

Signature: _____

Title: _____

Date: _____

3.9 DISPOSAL OF SUBMITTAL SAMPLES

When submittal samples are no longer required for review or testing, the SUBCONTRACTOR shall, upon notification from the CONTRACTOR, pick up and dispose of the samples in accordance with manufacturers' Material Safety Data Sheets (MSDS), all applicable Federal, State, and local regulations, and in a manner approved by the CONTRACTOR.

INSTRUCTIONS
ENG FORM 4288

1. Column a, will be provided by the SUBCONTRACTOR from his Network Analysis, if required, and when a network analysis is accepted.

2. Column b, will be provided by the SUBCONTRACTOR from Eng Form 4025 for each item. Transmittal number and Item number will be the same on both forms.

3. Column c, will be provided by the CONTRACTOR to the SUBCONTRACTOR.

4. Column d thru n, will be provided by the CONTRACTOR to the SUBCONTRACTOR.

5. Column o, will not be used

6. Column p, will be not be used.

7. Column q, will be provided by the SUBCONTRACTOR. It will be the scheduled date the SUBCONTRACTOR expects to submit an item. It is the SUBCONTRACTOR'S responsibility to calculate the lead time needed for the CONTRACTOR'S approval. Note if resubmittal is required, it is the SUBCONTRACTOR'S responsibility to make all adjustments necessary to meet the contract completion date.

8. Column r, will be provided by the SUBCONTRACTOR. It will be the latest date the SUBCONTRACTOR can receive an approval and still obtain the material by need date.

9. Column s, will be provided by the SUBCONTRACTOR. It will be the date that the material is needed at the site. If there is a network analysis it should reflect that date on the analysis.

10. Column t, will be provided by the SUBCONTRACTOR. The code will contain the action code used on Eng Form 4025, column g, for each item submitted to the CONTRACTOR.

11. Column u, will be provided by the SUBCONTRACTOR. The date will be the same as shown at the top of corresponding Eng Form 4025 and will reflect the date the actions shown in column t were rendered.

12. Column v, will be not be used.

13. Column w, will be provided by the CONTRACTOR. The code will contain the action code used on Eng Form 4025 column i, for each item submitted to the CONTRACTOR.

14. Column x, will be provided by the CONTRACTOR. The date when the actions listed in column w were taken will be entered. The date will be the same as shown in Eng Form 4025, Section II.

15. Column y, self explained.

Any revisions to the submittal register shall be submitted for approval by the SUBCONTRACTOR as soon as possible.

INSTRUCTIONS
ENG FORM 4025

1. DATE at the top of form will be the date submitted to the CONTRACTOR which is to be completed by the SUBCONTRACTOR.

2. TRANSMITTAL NO. Each new transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the item number, will form the submittal number for identifying each submittal. For new submittal or resubmittal, mark the appropriate box. Transmittal number for resubmittal will contain an alphabet letter following original transmittal number (e.g. resubmittal of Transmittal Number 5 will be Transmittal Number 5a).

3. TO: box will contain the name and address of the office which will review the submittal. The name and address should be given in paragraph 3.5.

4. FROM: box will be the name and address of the SUBCONTRACTOR. SUBCONTRACTOR is to complete this box.

5. CONTRACT NO. box will contain the SUBCONTRACTORS construction contract number.

6. CHECK ONE box will be completed by the SUBCONTRACTOR with one box marked. If a resubmittal is provided last transmittal number will be added.

7. SPECIFICATION SECTION NO. box will be completed by the SUBCONTRACTOR. The number will be the five digit number found in the specifications. No more than one section will be covered with each transmittal.

8. PROJECT TITLE AND LOCATION box will be completed by the SUBCONTRACTOR.

9. Column a, will be completed by the SUBCONTRACTOR and will contain a different number for each item submitted in that transmittal. Once a number is assigned to an item it will remain the same even if there is a resubmittal.

10. Column b, will be completed by the SUBCONTRACTOR. The description of each item on this form will include the descriptions provided by the CONTRACTOR on the submittal register Eng Form 4288 column d thru n plus any other data necessary to describe the item. The SUBCONTRACTOR shall submit each submittal register item all at once on one transmittal if possible. If a submittal register item can not be submitted all at once, SUBCONTRACTOR should note that in the remarks box. If a submittal register item requires several items, description shall contain submittal register description plus any additional specific descriptions. Additional items not on the submittal register will be noted in the remarks box.

11. Column c, will be completed by the SUBCONTRACTOR. The information will be the appropriate submittal description number as described in Section 01300 or shown on submittal register Eng Form 4288 column d thru n.

12. Column d, will be completed by the SUBCONTRACTOR. The number of copies will be determined by the SUBCONTRACTOR after review of paragraph 3.5 of Section 01305 "Submittal Procedures".

13. Column e, will be completed by the SUBCONTRACTOR. The SUBCONTRACTOR shall state all applicable paragraph numbers.

14. Column f, will be completed by the SUBCONTRACTOR. The SUBCONTRACTOR shall state all applicable drawing sheet numbers.

15. Column g, will be completed by the SUBCONTRACTOR. The action codes will be one of the following when submittal is for the CONTRACTOR:

A - Approved as submitted.
B - Approved, except as noted.
C - Approved, except as noted. Refer to attached sheet resubmission required.
G - Other (specify).

16. Column h, will be completed by the SUBCONTRACTOR. A check shall be placed in this column when a submittal is not in accordance with the plans and specifications, and a written statement to that effect shall be included in the space provided for "Remarks".

17. Column i, will be completed by the CONTRACTOR. The action code will be one of the following;

A - Approved as submitted.
B - Approved except as noted on drawings.
C - Approved except as noted on drawings. Refer to the attached resubmission sheet as required.
D - Will be returned by separate correspondence.
E - Disapproved (See Attached).
Fx - Receipt acknowledged, does not comply as noted with contract requirements.
G - Other (specify).

18. REMARKS box self explained.

19. SUBCONTRACTOR must sign all Eng Form 4025 certifying conformance.

20. Section II will be completed by the CONTRACTOR. SUBCONTRACTOR is not to write in this space.

See reverse side of ENG Form 4025 for additional instructions.

SAMPLE

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE *(Read Instructions on the reverse side prior to initiating this form)*	DATE	TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS *(This section will be initiated by the contractor)*

TO:	FROM:	CONTRACT NO.	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL _____
SPECIFICATION SEC. NO. (Cover only one section with each transmittal)	PROJECT TITLE AND LOCATION		

ITEM NO. *a.*	DESCRIPTION OF ITEM SUBMITTED *(Type size, model number/etc.)* *b.*	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. *(See Instruction no. 8)* *c.*	NO. OF COPIES *d.*	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE *g.*	VARIATION *(See Instruction No. 6)* *h.*	FOR CE USE CODE *i.*
				SPEC. PARA. NO. *e.*	DRAWING SHEET NO. *f.*			

REMARKS

I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as other wise stated.

_____

NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.)	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE

SUBMITTAL REGISTER (ER 415-1-10)														CONTRACT NO.									
TITLE AND LOCATION													CONTRACTOR									SPECIFICATION SECTION	
TRANSMITTAL NO.	ITEM NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION			CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
																	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.		n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.

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SAMPLE

SECTION 01320

CONSTRUCTION PHOTOGRAPHS

PART 1 GENERAL

1.1 SUMMARY

This section covers the required construction photographs to be taken at the site.

1.2 GENERAL REQUIREMENTS

SUBCONTRACTOR shall take construction record photographs periodically during the course of work.

1.3 SUBMITTALS

1.3.1 Prework Photographs

Take views of general site showing location and arrangement of facilities, equipment, fencing, and access roads.

1.3.2 Progress Photographs

After work has started at site, photographically record progress of Work. Include coverage of following:

a. Site preparation.
b. Site clearing.
c. Excavation and fill activities.
d. Decontamination of equipment.
e. Cleanup and restoration

Photographs shall illustrate conditions and location of work and state of progress. Photograph from locations to adequately illustrate condition of construction:

a. At each location to adequately illustrate condition of construction.
b. At successive periods of photography, take at least one photograph from the same overall view as previous.

Actual number and location of views to be taken for progress photographs shall be as directed by CONTRACTOR or his representative.

1.3.3 Post-Work Photographs

After completion of work, SUBCONTRACTOR shall take sufficient views of general site to record post-work condition using wide angle lens.

1.3.4 Negatives

If transfer of electronic formats to film is necessary, negatives shall remain property of CONTRACTOR.

1.4 QUALITY ASSURANCE

1.4.1 Use digital color camera, and provide DOS based program to view photographs.

PART 2 PRODUCTS

2.1 PRINTS *(The following section applies only when generating prints from electronic versions)*

2.1.1 Color

2.1.1.1 Paper

Commercial quality, single weight, white base

2.1.1.2 Finish

Smooth surface, glossy

2.1.1.3 Size

a. Prework, Post Work: 3-1/2-in. by 5-in.
b. Progress: 3-1/2-in. by 5-in.

2.1.2 Identification

2.1.2.1 Each print shall show, by photographic means, information box, 1 in. by 2 in. taped to bottom of photograph.

2.1.2.2 Box shall be typewritten and arranged as follows.

Project No.: Contract No.:

Contractor:

Photograph No.: Date:

Description:

PART 3 EXECUTION

3.1 TECHNIQUE

3.1.1 Factual presentation

3.1.2 Correct exposure and focus

3.1.2.1 High resolution and sharpness

3.1.2.2 Maximum depth-of-field

3.1.2.3 Minimum distortion

3.1.3 Floppy disks shall be stored as to prevent damage.

3.2 DELIVERY OF PRINTS AND ELECTRONIC MEDIA

3.2.1 Deliver electronic versions of each photograph, stored on 3-1/2" floppy disks, within 10 calendar days after taking photographs. Photographs and electronic media shall be CONTRACTOR property and not released by SUBCONTRACTOR to anyone except CONTRACTOR or his representative. "Hard copies" or prints of photographs shall be prepared and enclosed back-to-back in double-faced plastic sleeve punched to fit standard 3-ring binder. Both electronic versions and hard copies of photographs shall be properly identified by including the project number, date, and general description of the presentation.

SECTION 01401

SAFETY, HEALTH AND EMERGENCY RESPONSE

PART 1 GENERAL

1.1 SUMMARY

Safety, health and emergency response shall be as detailed in the below-referenced plan. All work performed under the project shall comply with all applicable federal, state and local safety and occupational health rules and regulations.

1.2 REFERENCES (NOT APPLICABLE)

1.3 GENERAL REQUIREMENTS

Safety, health and emergency response shall be as detailed in the "Task-Specific Health and Safety Plan," Appendix A of the "Landfill 2 Gradefill Work Plan".

PART 1. PRODUCTS (Not Applicable)

PART 2. EXECUTION

Safety, health and emergency response actions shall be as detailed in the "Task-Specific Health and Safety Plan," Appendix A of the " Landfill 2 Gradefill Work Plan".

SECTION 01405

TEMPORARY FIRE PROTECTION

PART 1 GENERAL

1.1 This section covers SUBCONTRACTOR'S responsibilities for the prevention and control of fire at the project site during the contract period.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Fire Extinguishers

Fire extinguishers shall consist of 20-pound type ABC fire extinguishers.

PART 3 EXECUTION

3.1 TRAINING OF SUBCONTRACTOR PERSONNEL

All SUBCONTRACTOR personnel who may be involved in fire fighting activities shall have received fire fighting training in accordance with OSHA 20 CFR 1910.156. Training shall include dealing with smoke in air supply masks and malfunctions in other protective equipment.

3.2 FIRE FIGHTING EQUIPMENT REQUIREMENTS

3.2.1 Site Trailers

A minimum of one fire extinguisher in each site trailer.

3.3 OUTSIDE ASSISTANCE

The SUBCONTRACTOR shall prearrange for the services of the Fort Carson Fire Department and coordinate roles of the local fire department and SUBCONTRACTOR personnel.

SECTION 01430

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 SUMMARY

Environmental protection shall be as described in the plans referenced below.

1.2 REFERENCES (Not applicable)

1.3 GENERAL REQUIREMENTS

Environmental protection requirements shall be as detailed in the "Task-Specific Environmental Protection Plan", Appendix B of the "Landfill 2 Gradefill Work Plan".

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 GENERAL

Environmental protection actions shall be as detailed in the "Task Specific Environmental Protection Plan", Appendix B of the "Landfill 2 Gradefill Work Plan".

SECTION 01440

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 SUMMARY

Quality control shall be as described in the plans referenced below.

1.2 REFERENCES (Not applicable)

1.3 GENERAL REQUIREMENTS

Quality Control requirements shall be as detailed in the "Task-Specific Quality Assurance Quality Control Plan", Appendix E of the "Landfill 2 Gradefill Work Plan".

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 GENERAL

Quality control actions shall be as detailed in the "Task-Specific Quality Assurance/Quality Control Plan", Appendix E of the "Landfill 2 Gradefill Work Plan".

SECTION 01500

TEMPORARY CONSTRUCTION FACILITIES

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Site Plan

The SUBCONTRACTOR shall prepare a site plan in accordance with the Drawings indicating the proposed location and dimensions of any area to be fenced and used by the SUBCONTRACTOR, the number of trailers to be used, avenues of ingress/egress to the fenced area and details of the fence installation. Any areas which may have to be graveled to prevent the tracking of mud shall also be identified. The SUBCONTRACTOR shall also indicate if the use of a supplemental or other staging area is desired.

1.1.2 Employee Parking

CONTRACTOR and SUBCONTRACTOR employees shall park privately owned vehicles in the area designated on the Drawings. CONTRACTOR and SUBCONTRACTOR employee parking shall not interfere with existing and established parking requirements of the military installation.

1.2 AVAILABILITY AND USE OF UTILITY SERVICES

1.2.1 Payment for Utility Services

The Government will make all reasonably required utilities available to the CONTRACTOR and SUBCONTRACTOR from existing outlets and supplies. The CONTRACTOR and SUBCONTRACTOR shall carefully conserve any utilities furnished without charge.

1.2.2 Meters and Temporary Connections

The SUBCONTRACTOR, in a manner satisfactory to the Contracting Officer or his representative, shall provide and maintain necessary temporary connections, and distribution lines.

1.2.3 Sanitation

The SUBCONTRACTOR shall provide and maintain within the construction area minimum field-type sanitary facilities in addition to sanitary facilities at the administration area approved by the Contracting Officer or his representative. Government toilet facilities will not be available to CONTRACTOR and SUBCONTRACTOR personnel.

1.2.4 Telephone

The CONTRACTOR and SUBCONTRACTOR shall make arrangements and pay all costs for telephone facilities desired.

1.3 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.3.1 Bulletin Board

Immediately upon beginning of work, the SUBCONTRACTOR shall provide a weatherproof glass-covered bulletin board not less than 915 by 1220 mm (36 by 48 inches) in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the

CONTRACTOR. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer or his representative. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the SUBCONTRACTOR.

1.3.2 Immediately upon beginning of work, the SUBCONTRACTOR shall provide a project safety sign in accordance with the sign specifications and details at the end of this Section.

1.4 PROTECTION AND MAINTENANCE OF TRAFFIC

During construction, the SUBCONTRACTOR shall provide access and temporary relocated roads as necessary to maintain traffic. The SUBCONTRACTOR shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer or his representative. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The SUBCONTRACTOR'S traffic on roads selected for hauling material to and from the site shall interfere as little as possible with normal traffic. The SUBCONTRACTOR shall investigate the adequacy of existing roads and the allowable load limit on these roads. The SUBCONTRACTOR shall be responsible for the repair of any damage to roads caused by construction operations.

1.4.1 Haul Roads

The SUBCONTRACTOR shall construct access and haul roads necessary for proper prosecution of the work under this contract. Haul roads shall be constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided. The SUBCONTRACTOR shall provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, shall be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads shall be subject to approval by the CONTRACTOR. Lighting shall be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations. Upon completion of the work, haul roads designated by the CONTRACTOR shall be removed.

1.4.2 Barricades/Fencing

The SUBCONTRACTOR shall erect and maintain temporary barricades or fencing to limit public access to hazardous areas. Such barricades shall be required as necessary to limit access of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

1.5 CONTRACTOR/SUBCONTRACTOR'S TEMPORARY FACILITIES

1.5.1 Administrative Field Offices

Both the CONTRACTOR and SUBCONTRACTOR shall provide and maintain administrative field office facilities within the CONTRACTOR'S storage yard.

1.5.2 Storage Area

The SUBCONTRACTOR shall construct a temporary 4 foot high international orange polyethylene safety fence around trailers and materials. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Trailers, materials, or equipment shall not be placed or stored outside the fenced area or outside the fenced are at the administrative field office unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the CONTRACTOR away from the vicinity of the construction site but within the military boundaries. The CONTRACTOR

will provide a portion of the storage area at he administrative field office for the SUBCONTRACTOR'S use. Trailers, equipment, or materials shall not be open to public view with the exception of those items which are in support of ongoing work on any given day. Materials shall not be stockpiled outside the fence in preparation for the next day's work. At the end of each work day mobile equipment, such as wheeled lifting equipment, cranes, trucks, and like equipment, shall be parked within the fenced area.

1.5.3 Supplemental Storage Area

Upon SUBCONTRACTOR'S request, the CONTRACTOR will designate another or supplemental area for the SUBCONTRACTOR'S use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but shall be within the military boundaries. Fencing of materials or equipment will not be required at this site; however, the CONTRACTOR shall be responsible for cleanliness and orderliness of the area used and for the security of any material or equipment stored in this area. Utilities will not be provided to this area by the Government.

1.5.4 Appearance of Trailers

Trailers utilized by the CONTRACTOR and SUBCONTRACTOR for administrative or material storage purposes shall present a clean and neat exterior appearance and shall be in a state of good repair. Trailers which, in the opinion of the Contracting Officer or his representative, require exterior painting or maintenance will not be allowed on the military property.

1.5.5 Maintenance of Storage Area

Fencing shall be kept in a state of good repair and proper alignment. Should the SUBCONTRACTOR elect to traverse with construction equipment or other vehicles grassed or unpaved areas which are not established roadways, such areas shall be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways; gravel gradation shall be at the SUBCONTRACTOR'S discretion.

1.5.6 Security Provisions

The SUBCONTRACTOR shall be responsible for the security of its own equipment.

1.6 CLEANUP

Construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways shall be cleaned away. Materials resulting from demolition activities which are salvageable shall be stored within the fenced area described above or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored.

1.7 RESTORATION OF STORAGE AREA

Upon completion of the project and after removal of trailers, materials, and equipment from within the fenced area, the fence shall be removed and disposed of at an appropriate off-site facility. Areas used by the SUBCONTRACTOR for the storage of equipment or material, or other use, shall be restored to the original or better condition.

SECTION 01702

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SUMMARY

This section covers the activities necessary to close out the contract.

1.2 GENERAL REQUIREMENTS

1.2.1 Work Activities

Work activities for contract closeout shall include the following:

a. Decontamination and removal from site of all SUBCONTRACTOR equipment and materials within the Exclusion Zone.

b. Collection and disposal of all SUBCONTRACTOR-generated contaminated materials and equipment for which decontamination is inappropriate.

c. Decontamination of site-dedicated equipment and facilities operated by the CONTRACTOR and removal from site of same.

d. Disconnection and removal of temporary utilities from site.

e. Removal of support area facilities.

f. Repair of permanent site security fences damaged during the performance of the work.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 DECONTAMINATION

All facilities, equipment, and materials that may have been in contact with potentially contaminated materials shall be decontaminated in accordance with the procedures described in SECTION 01900: MATERIAL AND EQUIPMENT DECONTAMINATION prior to final removal.

3.2 RETENTION ON SITE

In general, all small tools and materials for which decontamination is difficult or uncertain shall remain on site until completion of the work for subsequent disposal. Examples of such equipment or materials include wire, rope, lumber, personnel protection equipment and apparel in accordance with the Waste Management Plan submitted as Appendix C of the Landfill 2 Gradefill Project Work Plan.

3.3 UTILITIES

Temporary telephone lines, water lines, electric service lines, utility poles, and outdoor lighting fixtures required during the construction period shall be disconnected at the source and removed from the site.

3.4 OPERATIONS AREA

All equipment and facilities used for closure activities shall be thoroughly decontaminated prior to site closeout. Sediments and liquid shall be removed from sumps and disposed in accordance with the Waste Management Plan referenced in Paragraph 3.2.

3.5 WASH UNITS

Wash units in the personnel decontamination area shall be the final equipment removed from the site.

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SUMMARY

Maintain at site one record copy of:

1. Drawings.
2. Project Manual.
3. Addenda.
4. Change orders and other modifications to Contract.
5. CONTRACTOR field orders, written instructions, or clarifications.
6. Approved submittals.
7. Field test records.
8. Construction photographs.
9. Associated permits.
10. Certificates of inspection and approvals.

1.2 SUBMITTALS

1.2.1 General

At Substantial Completion:

/*SD-04 DRAWINGS*/

Deliver one marked up set of Drawings and Specifications to CONTRACTOR for use in preparation of record Drawings.

1.2.2 Transmittal Letters

Accompany submittals with transmittal letter containing following:

a. Date.
b. Project title and number.
c. SUBCONTRACTOR'S name and address.
d. Title of record document.
e. Signature of SUBCONTRACTOR or authorized representative.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 MAINTENANCE OF DOCUMENTS AND SAMPLES

3.1.1 General

Maintain documents in clean, dry, legible condition and in good order. Do not use record documents for construction purposes. Make documents and samples available for inspection by CONTRACTOR or OWNER. Failure to properly

maintain record documents may be reason to delay a portion of progress payments until records comply with Contract Documents.

3.1.2 Storage

Store documents and samples in SUBCONTRACTOR'S field office apart from documents used for construction.

a. Provide files and racks for storage of documents.
b. Provide secure storage space for storage of samples.

3.2 RECORD DOCUMENTS

3.2.2 Labeling

Label each document "PROJECT RECORD" in neat, large printed letters.

3.2.3 Alterations

Maintain record set of Drawings and Specifications legibly annotated to show all changes made during construction.

a. Graphically depict changes by modifying or adding to plans, details, or sections. Changes in horizontal location and associated elevations shall be transmitted to the CONTRACTOR via the survey data; however, obvious changes to the plans shall be noted on the Drawings with reference to survey data providing more precise information.

b. Make changes on each sheet affected by changes.

c. Do not conceal Work until required information is recorded.

d. Record changes made by Written Amendment, Field Order, Change Order or Work Directive Change.

3.2.4 Drawings

3.2.4.1 General

a. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

b. Location of utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.

c. Field changes.

d. Details not on original Drawings.

3.2.4.2 Specifications

a. Mark Specification sections: to show substantial variations in actual Work performed in comparison with test of Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation.

b. Note related record drawing information and Product Data.

SECTION 01900

MATERIAL, VEHICLE, AND EQUIPMENT DECONTAMINATION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

Prior to introduction of personnel or equipment into the work area, the SUBCONTRACTOR shall provide a pad for decontamination of equipment, vehicles, and personnel. The SUBCONTRACTOR is responsible for submitting a detail drawing of the proposed pad, a plan for maintaining the pad, and the proposed pad location to the CONTRACTOR for approval.

PART 2 PRODUCTS

The decontamination pad must, at a minimum, be of an appropriate size to accommodate vehicles and equipment, be capable of supporting the weight of heavy equipment and fully loaded vehicles leaving the construction site, and be constructed to drain to a point from which rinsate and solids/sediments from decontamination can be collected. The pad and sump shall be constructed to accommodate a 25-year, recurrence interval, 24-hour duration rainfall without overfilling. The pad shall be constructed of a durable leak proof material capable of containing all wash and rinse water anticipated for each wash event.

PART 3 EXECUTION

- Wash water from the decontamination area shall be collected and disposed of as stated in Section 02720: CONTAMINATED LIQUIDS REMOVAL.
- Solids from the decontamination area shall be collected and either solidified and placed under the landfill cap, or stored and tested for disposal as stated in the Waste Management Plan, contained in Appendix C of the Landfill 2 Gradefill Project Work Plan.
- Any spill or release of hazardous material from the decontamination pad is the responsibility of the SUBCONTRACTOR. This includes costs associated with containment and cleanup of spills, disposal of contaminated materials, and any fines or penalties related to the spill/release.
- The pad shall also be used to clean the tires of vehicles leaving the site, if needed.
- The pad shall be removed upon completion of the project.

DIVISION 2
SITEWORK

SECTION 02110

SITE PREPARATION

PART 1 GENERAL

1.1 SUMMARY

Section Includes:

1. Protection.
2. Preparation.
3. Clearing and grubbing.
4. Restoration.

1.2 DEFINITIONS

1.2.1 Structures and Surface Features

Existing structures and surface features including buildings, pavements, curb and gutter, signs, posts, fences, trees, shrubs, landscaped surface features, and other miscellaneous items.

1.2.2 Utilities

Existing gas mains, water mains, steam lines, electric lines and conduits, telephone and other communication lines and conduits, sewer pipe, cable television, other utilities, and appurtenances.

1.2.3 Clearing and Grubbing

Cutting and disposing of trees, brush, windfalls, logs, grasses, and other vegetation, and removing and disposing of roots, stumps, stubs, grubs, logs, and other timber.

1.3 PROJECT/SITE CONDITIONS

Do not block or obstruct roads or streets with excavated or grubbed materials, except as authorized by the CONTRACTOR.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 PROTECTION

Existing utilities shall be protected against damage. Fort Carson personnel shall be contacted by the SUBCONTRACTOR for marking (or verifying) utility locations before beginning excavation. If excavation work is being performed within the immediate area (10 feet) of existing buried utilities, existing underground utilities shall be located by hand excavation. If uncharted utilities are encountered during excavation, stop work in the immediate area or as appropriate and notify CONTRACTOR and the appropriate utility provider. Damaged utilities shall be repaired at the SUBCONTRACTOR'S expense.

The SUBCONTRACTOR shall preserve and protect groundwater monitoring wells. Damaged or destroyed monitoring wells shall be replaced at SUBCONTRACTOR'S expense. SUBCONTRACTOR shall protect, support, and maintain conduits, wires, pipes or other utilities that are to remain in place during work.

3.2 PREPARATION

The SUBCONTRACTOR shall provide 3 working days notice, prior to beginning construction, to owners of existing utilities, structures, and surface features. Obstructions such as fences, culverts, end walls, and guard posts shall be removed and replaced when need for removal is completed. The SUBCONTRACTOR shall provide stormwater discharge and erosion control.

3.3 CLEARING AND GRUBBING

The SUBCONTRACTOR shall clear and grub to provide access to construction area, drives, and where grade is to be raised of shrubs, trees, stumps, vegetation, rubbish, and other perishable or objectionable matter. Stumps shall be grubbed to depth of not less than 12 inches below original ground surface or subgrade. Cleared material shall be relocated within fill area for disposal under the final cap barrier layer. Cleared material shall be compacted and densified within fill area by blending with waste soil and traversing maximum 2 foot thick lifts with a minimum of 5 passes with a CAT 825C compactor or alternate piece of equipment approved by CONTRACTOR. For Landfill 5, place any cleared material east of the parking lot area (i.e., within capping limits south/southeast of the Dog Kennel).

3.4 RESTORATION

Existing utilities, surface features, and structures shall be restored to condition equal to condition which existed prior to construction. Damaged landscape work within and outside of construction limits shall be replaced to original condition or better in accordance with Section 02930.

SECTION 02222

MASS EXCAVATION AND FINAL CAP SUBGRADE PREPARATION

PART 1 GENERAL

1.1 SUMMARY

Section Includes:

1. Excavation for waste relocation.
2. Site grading to achieve final cap subgrade elevation.

1.2 DEFINITIONS

1.2.1 Waste

Man made materials which may be mixed with soils (e.g., municipal waste; construction, demolition, or municipal waste within a soil matrix). Waste may also be contaminated soil with or without waste mixed within the soil (e.g., soil contaminated with oil).

1.2.2 Non-Waste Soils

In situ soils or rock which do not contain waste materials and which were naturally deposited in their present location, or uncontaminated soil or rock which has been relocated (e.g., non-waste soil fill).

1.2.3 Controlled Fill

Soil from an approved (per CONTRACTOR) borrow source which is free of waste materials and free of ice or snow, organic soils, vegetation, wood, peat, stones larger than 6 in. in any direction, or other unsuitable material. Controlled fill shall be a material which is readily capable of being compacted as an engineered fill material.

1.3 SUBMITTALS

SD-01\Data\

Equipment\

List of proposed equipment to be used in performance of construction work including descriptive data.

PART 2 MATERIALS

2.1 CONTROLLED FILL

If required, supply per definition above.

PART 3 EXECUTION

3.1 PREPARATION

Certain areas of the landfill are designated for excavation and others for fill to meet final cap subgrade elevation (see Drawings). Waste shall be excavated from designated areas per the Drawings and relocated to designated fill areas per the Drawings.

1. Place erosion protection per Section 02930.
2. After clearing and grubbing (Section 02110), check for wet soils and disc or otherwise allow to dry prior to placing fill.
3. Proof roll fill area to receive fill in order to identify areas of soft material. Deflection of 6 in. is considered soft when traversed with fully loaded, wheeled, heavy construction equipment.
4. Remove soft material and replace with soil or waste fill, or bridge the area with material capable of adequately limiting deflection. Proof roll and repeat as necessary.
5. Any removed material shall be set aside and allowed to dry to reduce moisture content. This material will also be used at a later time as fill to reach final cap subgrade elevation.
6. Remove ice, snow, and frozen material from fill area prior to beginning placement.

3.2 SITE GRADING

Uniformly grade areas to smooth surface, free from irregular surface changes. Grade to cross sections, lines, and elevations indicated.

1. Provide smooth transition between existing adjacent grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.

3.3 EXCAVATION

1. Excavate within limits of Project to lines, grades, and elevations shown on Drawings.

2. Transport excavated materials to fill area.

3. Proof roll final excavation surface and over excavate to remove excessively soft or unsuitable material which will not form an adequate subgrade for the final cap layer. Replace with controlled fill and compact. Repeat proof rolling and replacement procedure if necessary in corrected area.

4. If waste materials extend beyond the limit of excavation shown on the Drawings, it shall be relocated within the final limit of landfill and capped. Placement of engineered backfill may be required to maintain positive drainage if excavation extends beyond the limit of excavation shown on the Drawings, or below excavation grades shown. Discuss with CONTRACTOR prior to extending excavation beyond limits or grades shown on the Drawings.

5. If wet waste is encountered at the final gradefill elevation, further excavation shall be performed to remove a minimum of an additional 2 feet of waste. Replacement of overexcavated waste shall be performed using clean backfill placed in accordance with Section 3.5 of this Specification and as such to facilitate the placement of overlying fill and cap materials.

3.4 DEWATERING

1. Maintain surface water control and free drainage.

2. Provide surface water pumps, hoses and other necessary equipment and labor to keep excavation free of standing water. Water coming in contact with waste shall be collected and disposed per Section 02720.

3.5 MATERIAL PLACEMENT

1. Scarify prepared surface before placement of fill material to provide bonding between materials.

2. Begin construction of waste fill at lowest point of fill below grade and construct in layers by spreading and leveling material during placement. Spread individual layers to uniform thickness throughout and approximately parallel with finished grade within current working area of fill placement. Step transition between work areas as filling progresses to prevent vertical joints within fill.

3. Place materials uniformly in maximum 1-foot loose lifts within current working area of fill placement.

4. Compact materials by traversing with a minimum of 5 passes with a CAT 825C compactor or alternate piece of equipment approved by CONTRACTOR before placing next lift. Revisions to the number of passes and equipment type may be made with CONTRACTOR'S approval.

5. Maintain lifts to provide positive drainage away from construction.

6. Where material for fill consists of rock, rubble, or waste material of such size as to render placing in 1-foot layers impractical, material may be placed in layers not exceeding in thickness approximate average size of larger materials provided individual pieces are so placed that there will be no nesting, and voids are filled with smaller soil waste materials.

7. Do not place frozen materials, and do not place materials on frozen surfaces.

8. Municipal waste that is uncovered during excavation activities will be covered with a 6-inch daily cover. A 12-inch intermediate cover will be placed over areas of excavated municipal waste after completion of the gradefill activities. The 6-inch daily cover and the 12-inch intermediate cover will consist of imported soil or soil from within the landfill which is free of municipal waste or debris.

9. Wet waste shall be spread over an area to receive fill and shall be allowed to air dry to a sufficient state that it may be compacted and may serve as adequate material for placement of overlying fill and cap materials. Supplemental aeration may be necessary to facilitate drying.

3.6 FIELD QUALITY CONTROL BY CONTRACTOR

3.6.1 Testing

3.6.1.1 Compaction of waste materials

Observation and documentation of compaction methods including lift thickness, type of equipment used, and number of passes.

3.6.1.2 Controlled Fill

Observation and documentation of corrected areas including placement and compaction of controlled fill, with follow up proof rolling.

3.6.2 Tolerances

Excavation and final cap layer subgrade 0.5 feet horizontal and ±0.2 feet vertical unless approved in writing by CONTRACTOR.

3.6.3 Final Grades

Completed excavation grades and finished fill grades to achieve final cap layer subgrade shall be surveyed by SUBCONTRACTOR and approved by CONTRACTOR before further placement of final cap materials.

SECTION 02253

GAS MONITORING PROBES

PART 1 GENERAL

1.1 SUMMARY

Section Includes:

1. Applicable publications
2. Submittals
3. Materials
4. Execution
5. Documentation

1.2 APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

1.2.1 American Society for Testing and Materials (ASTM) Publications

A 53-89a	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
C 150-86	Standard Specification for Portland Cement.
D 1785-89	Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120.

1.2.2 American Association of State Highway and Transportation Officials (AASHTO) Publications

M43-90	Sizes of Aggregate for Road and Bridge Construction.

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01300 Submittal Descriptions:

SD-01 Data\
Installation Diagrams\ (Paragraph 4.1)

PART 2 MATERIALS

2.1 GAS PROBE CASING

Piping material used in construction of the probes shall consist of 2-inch nominal diameter, flush-joint, threaded, polyvinyl chloride (PVC) plastic. All pipe shall be new. Pipe shall meet the requirements of ASTM D 1785-89. The minimum wall thickness shall be schedule 40. Threaded ends shall have a chemically inert O-ring on the male end of the pipe. A threaded airtight cap shall be supplied for the casing. Flexible 1/4" I.D. tubing with a positive seal clamp shall be installed in the airtight cap.

2.2 GAS PROBE SCREEN

A screen shall consist of 1-inch nominal diameter, threaded flush joint, new, Schedule 40, 0.020" factory slotted screen. Screen lengths for individual gas monitoring probes may vary, and will be depicted on the drawings. The screen shall be joined to the riser casing by a flush threaded joint. The bottom of the screen shall be sealed by a flush-threaded PVC end plug.

2.3 GRANULAR FILTER PACK

Filter pack length shall be as shown on the drawings. Granular filter pack material shall meet the requirements for stone or gravel coarse aggregate, as presented in AASHTO No. 57. The percentage of crushed fragments for gravel does not apply. The gradation shall be as follows:

Sieve Size	Total Percent Passing
1-1/2"	100
1"	95-100
1/2"	25-60
No. 4	0-10
No. 8	0-5

A minimum of 0.5-feet of 20/40 silica sand shall be placed directly above the granular filter pack to prevent bentonite pellets from infiltrating the gravel.

2.4 PROBE SEAL AND GROUT

Bentonite pellet seal shall be as shown on the drawings. Grout shall consist of a mixture of 94 pounds of Type II Portland Cement, 3 pounds of powdered sodium bentonite and a maximum 8 gallons of water. Cement shall meet the requirements of ASTM C 150.

2.5 PROTECTIVE COVERS

Galvanized steel protective casing of 4-inch diameter shall be grouted in place around each gas monitoring probe. The protective casing shall be imbedded a minimum of 2 feet below grade. Protective covers shall have a locking lid, and keyed alike locks shall be provided.

PART 3 EXECUTION

3.1 DRILLING METHOD

Borings for gas monitoring probe installation shall be drilled by the hollow stem auger or other approved method. The use of drilling fluids shall not be permitted. The drilling method must prevent the collapse of waste material against or within 2 inches of the probe screen and casing during installation of the gas monitoring probe. The drill rig shall be free from leaks of fuel, hydraulic fluid, or oil which may contaminate the working area.

3.2 WATER SOURCE

If probe drilling/installation requires the use of water, the water source shall be potable water. The water shall be protected from contamination by oil, organics, acids, alkali, and other deleterious substances.

3.3 GAS MONITORING PROBE DEPTH

Depth of borings for the gas monitoring probes shall be as shown on the drawings.

3.4 GAS MONITORING PROBE INSTALLATION

Gas monitoring probes shall consist of specified screen, casing, and caps, and all materials shall be new, clean, and in good condition. The probe shall be placed in the hole in such a manner as to avoid jarring impacts and to ensure the assembly is not damaged. The probe shall be installed while the hollow stem auger or temporary casing is still in place in the boring. The probe shall be centered in the hollow stem auger or temporary casing.

3.5 GRANULAR FILTER PACK PLACEMENT

A minimum 0.5-feet (or as otherwise specified on the drawings) of filter pack shall be placed in the boring prior to installation of the probe. The filter pack shall be placed in such a manner as to ensure continuous, uniform placement around the screen. The hollow stem auger or temporary casing shall be withdrawn from the boring as the filter pack is placed. The level of the filter pack shall not fall below the bottom of the auger or casing during placement of the filter pack. The filter pack shall extend a minimum 0.5-feet above the top of the screen (or as otherwise specified on the drawings). All filter pack

materials shall be transported to the site in a manner that prevents contamination by other soils, oil, and grease, and other chemicals.

3.6 GAS MONITORING PROBE ALIGNMENT
All probes shall be set straight and true to line.

3.7 DRILL CUTTINGS
Cuttings shall be disposed as described in the Work Plan.

3.8 SURFACE COMPLETION
A concrete pad, 3' x 3' square x 6" thick shall be placed around each gas monitoring probe.

3.9 PROTECTION OF EXISTING UTILITIES
The contractor shall protect and maintain existing structures, survey monuments, and all gas monitoring probes from damage from equipment and vehicular traffic. Any gas monitoring probes requiring replacement shall be replaced according to these specifications.

PART 4 DOCUMENTATION

4.1 INSTALLATION DIAGRAMS
An installation diagram shall be completed for each gas monitoring probe installed. The scale of the diagram shall be 1-inch equals 2-feet. The diagram shall be prepared during gas monitoring probe installation operations and submitted within 5 working days after the completion of each gas monitoring probe installation. The diagram shall illustrate the as-built condition of the gas monitoring probe and include, but not be limited to the following items:

- Name of the project and site;
- Gas monitoring probe identification number;
- Name of the driller and name and signature of the person preparing the diagram;
- Date(s) if installation;
- Description of material from which the gas monitoring probe is constructed, including casing and screen material, diameter and schedule of casing and screen, and joint type (threaded, etc.);
- Total depth of gas monitoring probe;
- Nominal hole diameter;
- Depth to top and bottom of screen and filter pack;
- Type and quantities of cement and bentonite used, mix ratios of grout, and quantities used;
- Elevations of key features of the gas monitoring probe, such as top of casing, top and bottom of protective casing, ground surface, bottom of probe screen, top and bottom of seal(s), and top and bottom of filter pack;
- Other pertinent construction details, such as gradation and depth of granular filter pack, quantities of granular filter pack installed, screen type and slot size, and manufacturer of screen;
- Gas monitoring probe location by coordinates. A plan sheet shall also be included showing the coordinate system used and the location of each monitoring probe. A plan sheet is not required for each installation diagram; multiple probes may be shown on the same sheet;
- A brief stratigraphic log showing major changes in lithology and the depths to those changes.

SECTION 02720

CONTAMINATED LIQUIDS REMOVAL

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Sources

Contaminated liquid sources include personnel and vehicle decontamination activities, free liquids, and sanitary sewage wastewater from personnel facilities. Free liquids consist of liquids from spills, contaminated runoff, and liquids encountered during excavation.

1.1.2 Procedures

The SUBCONTRACTOR shall be responsible for the collection, removal, and disposal of contaminated liquids as described above. Refer to the Waste Management Plan, contained in Appendix C of the Landfill 2 Gradefill Project Work Plan.

1.1.3 Characterization

The SUBCONTRACTOR is responsible for the sampling, analysis, and characterization of contaminated liquids as may be needed to meet regulatory requirements and the treatment/disposal facility requirements.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 DECONTAMINATION PAD

Water generated and collected from the decontamination pad shall be tested and properly disposed of as stated in the Waste Management Plan noted above.

3.2 FREE LIQUIDS

Leachate encountered and removed during excavation within the limits of the landfill, and runoff contaminated by fuels, oils, waste, and other harmful materials shall be collected, tested, and properly disposed of as stated in the Waste Management Plan noted above.

3.3 SANITARY SEWAGE WASTEWATER

All sanitary sewage wastewater shall be stored separately from all other contaminated liquids and shall be disposed of in accordance with the Waste Management Plan noted above.

SECTION 02930

GENERAL SEEDING

PART 1 GENERAL

1.1 SUMMARY

The following specification is an adaptation from "General Downrange Seeding Specifications for Fort Carson," dated March 1995, which was provided by DECAM.

1.2 REFERENCES

The following publications listed below form a part of the specification to the extent referenced. The publications are referenced in the text by basic designation only.

U.S. DEPARTMENT OF AGRICULTURE: Federal Seed Act of 9 August 1939 (53 Stat. 1275)

DECAM: General Downrange Seeding Specifications for Fort Carson, March 1995

1.3 SUBMITTALS

SD-01 Data\

Manufacturer's Catalog Data\

Manufacturer's standard catalog data giving the brand names and catalog numbers of erosion control materials, in sufficient detail to demonstrate complete compliance with this section.

1. Erosion control blanket
2. Channel lining
3. Erosion control fence

Equipment\

List of proposed equipment to be used in performance of construction work including descriptive data.

SD-06 Instructions\

Manufacturers Instructions\

The manufacturers installation instructions and procedures.

SD-09 Reports\

Sampling and Testing\

Copies of field test results within 24 hours of completion of tests.

Approval of Materials\

Material sources and material test results prior to field use.

1.4 QUALITY CONTROL

The SUBCONTRACTOR shall establish and maintain quality control for operations under this section to assure compliance with contract requirements and maintain records of quality control for materials, equipment, and construction operations. The SUBCONTRACTOR shall notify DECAM through the CONTRACTOR at least 2 weeks prior to the start of seeding operations.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

Material used for seeding, such as seed, fertilizer, hay, hay bales, blankets, etc., shall be inspected upon arrival at the job site. Unacceptable material shall be removed from the job site.

1.5.2 Storage

Seed shall be protected from any drying, moisture or contamination by detrimental material upon delivery and when being stored.

PART 2 PRODUCTS

2.1 SEED

Seed shall be state-certified seed of the latest season's crop and shall be delivered in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, weed-seed content, and inert material. All seed material shall be certified to be free of noxious weed seed. The date of testing shall be one year or less at time of planting. Seed shall be labeled in conformance with U.S. Department of Agriculture rules and regulations under the Federal Seed Act and applicable state seed laws. Seed that has become wet, moldy, or otherwise damaged will not be acceptable. All seed shall be adapted to southeast Colorado.

Onsite seed mixing shall be performed only in the presence of the CONTRACTOR. The pure live seed mixture to be used shall be as follows:

2.1.1 Seed Mixture

Seed Mixture: The mixture of each seed lot shall contain the following pounds of pure live seed per acre.

FORT CARSON - CRITICAL AREA SEED MIX	
Species	LB PLS/AC
[1] Barton Western Wheatgrass (Agropyron smithii)	6.0
[1] Vaughn sideoats grama (Bouteloua curtipendula)	3.0
Alkali sacaton (Sporobolus airoides)	0.2
Nordan Crested Wheatgrass (Agropyron desertorun)	1.0
Sand dropseed (Sporobolus cryptandrus)	0.1
Small burnet (Sanguisorba minor)	0.5
Ladak alfalfa (Medicago sativa)	0.5
TOTAL	11.30

[1] When Vaughn Side Oats Grama (Bouteloua curtipendula) is not available, Pastura Little Bluestem (Schizachyrium scoparium) or El Reno sideoats grama (Bouteloua curtipendula) at same LB PLS/AC shall be used as a substitute when approved by DECAM through the CONTRACTOR. Likewise, when Barton Western Wheatgrass is not available, Arriba Western Wheatgrass at the same seeding rate may be used when approved by DECAM through the CONTRACTOR. The seed varieties shall be mixed and sacked in the proper amount by the seed supplier according to the seed mix.

2.1.2 Critical Area Seeding Rate

Those areas which have been graded, received repeated foot traffic or have slopes 3:1 or greater. The seeding mix and rate stated in paragraph A shall be applied to all areas designated as a critical area.

2.1.3 Commercial Seed Formula

The following formula shall be used to determine the amount of commercial seed required to provide in each kind of seed the specified quantities of Pure Live Seed (PLS).

$$\frac{\text{Required Pounds Pure Live Seed} \times 100 \times 100}{\text{Purity}^2 \times \text{Germination}^2} = \text{Pounds Commercial Seed}$$

[2] Purity and Germination expressed as whole numbers.

2.2 NUTRIENT AMENDED SOIL/TOPSOIL

2.2.1 Definitions

The nutrient amended soil or topsoil layer is to be considered the upper four inches of the frost protection layer that has been amended as discussed below.

2.2.2 Soil Amendment

Soil to be used for the topsoil layer shall be free from hard lumps, plants and their roots, gravel, cinders, stone over 1 inch in any dimension, toxic substances, and any material or substance that may be harmful to plant growth.

2.2.3 Documentation

a. Two sieve analysis for each source.
b. Two organic matter content, ASTM D2974, Method C.
c. Two tests each for the following: nutrient requirements, N, P, K, and applicable micro-nutrients for proposed seed mixture.

2.3 MULCH

2.3.1 Placement

The SUBCONTRACTOR shall use native grass hay at a rate of two tons (air dry weight) per acre, fixed in place with disk land packers or disk harrows on all surfaces with a 3:1 slope or less. Slopes steeper than a 3:1 slope shall require an erosion control blanket as described in Section 2.41. All other mulch materials and/or methods of application shall be approved by DECAM through the CONTRACTOR, prior to application.

2.3.2 Type

Mulch shall be long stem native grass hay that is free from noxious weeds, mold or other objectionable material. When long stem native grass hay is not available, a substitute may be used when approved by DECAM through the CONTRACTOR. If approved, acceptable substitutes are straw from oats, wheat, rye, barley or rice from which grain has been removed, and that are free of noxious weeds, mold, or other objectionable material. The mulch shall contain at least 50 percent by weight of material which is 10 inches or longer. Mulch shall be in air-dry condition and suitable for placing with blower equipment.

2.4 SOIL EROSION CONTROL MATERIAL AND STAPLES

2.4.1 Erosion Control Blanket

Soil Erosion Control Blanket shall consist of a machine produced mat of biodegradable material. It shall be certified by the supplier or manufacturer to be of sufficient quality and design to function as intended on slopes greater than 3:1 with moderate to heavy runoff conditions. The erosion control blanket shall be a uniform thickness, with all material evenly distributed over the blanket. The blanket shall be covered on one side with either plastic netting or twisted kraft paper cord netting. Plastic netting shall be biodegradable polypropylene extracted plastic net with 1 to 2 percent carbon black and shall have a ½-inch to 3/4-inch mesh opening. Twisted kraft paper cord netting shall have a mesh size not to exceed 1-1/2 inches by 3 inches. The blanket shall be composed of either biodegradable straw, coconut, or wood fiber of any approved mixture. A substitute may be used when approved by DECAM through the CONTRACTOR. No blanket with paper as the major component shall be used unless prior approval is obtained from DECAM through the CONTRACTOR. The blanket shall be laid in a 1 foot trench, stapled every ½ yard, and covered with soil on the entire length of its upper slope. The erosion control blanket shall then be securely stapled to the site using staples as described in 2.42. All manufacturer's specifications shall be supplied to DECAM and CONTRACTOR for approval prior to application.

2.4.2 Staples

Staples shall be made of 11 gauge or heavier steel wire, "U" shaped with a 1-inch crown, and legs a minimum of 8 inches in length. These staples shall be placed according to the slope gradient and length, as specified by the manufacturer.

2.4.3 Channel Lining (Erosion Matting for Channels)

The fabric utilized shall meet the manufacturer's recommendations for the proposed use. The staple pattern utilized shall be as recommended by the manufacturer. The CONTRACTOR shall be provided the manufacturer's specifications (including installation methods) prior to application, and based upon his/her review, the material may or may not be accepted. Enkamat 7010 or equivalent (based on shear stress resistance) shall be used. The erosion matting is for long-term erosion protection and biodegradable materials shall not be used.

2.4.4 Erosion Control Fence

Silt fencing shall be made of a strong rot-proof synthetic fiber. The fibers shall be resistant to deterioration due to ultraviolet light and heat exposure. The synthetic fibers shall be woven into a fabric. No additional fencing or wire backing is required. The fencing material shall have a strong tie cord in the top of the material. Low porosity silt fence shall be the same as or equal to Propex-Silt Stop, Mirafi 700x, or Beltech 755 or equal as approved by CONTRACTOR.

2.4.5 Straw or Hay Bales

Bales for erosion check shall be either straw or hay bales tied firmly with wire or plastic tie and shall be 14" to 16" high x 18" x 36" in size. Wood stakes to secure the bales shall be a minimum of 2" x 2" x 36" in size.

PART 3 EXECUTION

3.1 DATES FOR SEEDING

Seedbed preparation and seeding shall be accomplished between the dates of 1 May to 31 October, depending upon soil moisture conditions, except as otherwise directed in writing by DECAM through the CONTRACTOR. Seeding operations shall not be performed when the soil is wet, sticks to tires and equipment, or is frozen.

3.2 PREPARATION OF SEEDBED

3.2.1 General

All vegetation, weeks, brush, and rubbish shall be cleared and removed from areas to be seeded. Ground surface shall conform to the grades indicated and any deviations therefrom shall be corrected prior to seeding. Soil used for repair of erosion and correction of grade deficiencies, shall conform to that specified in 2.2.

3.2.2 Tillage

Tillage should be performed only if the area was previously graded, otherwise the site should be seeded only (tillage may be required as specified by the CONTRACTOR). The soil shall be tilled to a depth of at least 4 inches and no more than 6 inches by plowing, discing, harrowing, by the use of rototillage machinery or other approved operations to prepare an acceptable seedbed. The work shall be performed only during periods when, in the opinion of the CONTRACTOR, beneficial results are likely to be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed by the CONTRACTOR. The soil surface shall be leveled to meet finished grade requirements before the next specified operations. All seedbed preparation shall be performed on the contour to reduce soil loss. On slopes greater than 3 horizontal to 1 vertical, tillage shall be done by scarifying the soil surface with heavy rakes, rotating chains drawn by tractor from the top of the slope, by a boom arrangement from the bottom of the slope, or by other equipment approved by the CONTRACTOR. On these slopes, minimum tillage depth shall be 2 inches. No tillage is required on slopes steeper than 1 horizontal to 1 vertical.

3.3 PLANTING SEED

3.3.1 General

Any previously prepared seedbed areas compacted or damaged by interim rains, traffic, or other cause, shall be reworked to restore the ground condition previously specified prior to seeding. Seed shall be planted (drilled) as specified in paragraph 2.1.

3.3.2 Methods

The specified seed varieties and indicated amounts of the mixture shall be uniformly drilled over all ground areas disturbed in a manner that will produce an even stand of grass over the entire areas seeded. On areas with slopes 3:1 or flatter, (unless limited by size of area) seed shall be drilled using a rangeland seed drill, unless otherwise approved by DECAM through the CONTRACTOR.

3.3.2.1 Drill Seeding

The seed shall be drilled using a rangeland drill. The rangeland drill will be pulled at a speed not to exceed 4 mph. The seed shall be drilled and covered to a depth not less than 1/4 inch or more than 3/4 inch. The drill rows shall be spaced no more than 10 inches apart. The seed drill shall be calibrated to achieve seeding rates outlined in paragraph 2.01.

3.3.3 Vegetative Mulching

Vegetative Mulching shall be done within the same day as seeding.

3.3.3.1 Applying Mulch

Mulch shall be spread uniformly in a continuous blanket over the seeded areas, using two tons (4,000 lbs) of material per acre. The mulch shall be spread in such a manner as to prevent bunching.

3.3.3.2 Securing Mulch

Immediately following the spreading of the mulch, the material shall be anchored securely into the soil a minimum of 3 inches by means of a mulch anchoring machine equipped with large coulter-type discs spaced on approximate 8-inch centers. Edges of the discs shall be dull to prevent cutting of the mulch material. In areas where equipment cannot be used, mulch shall be secured by a shallow covering of earth or by embedding with approved hand methods, including a straight blade spade with a dulled edge.

3.3.4 Watering

No water will be applied to native, field, (dry land) seedings unless required for erosion control blanket installation.

3.4 SOIL EROSION CONTROL MATERIAL

Erosion control material shall be installed on all slopes steeper than 3:1. Crimped mulch shall be used on all slopes that are 3:1 to 2.5:1. Slopes steeper than 2.5:1 shall be covered with erosion control blankets. Mulching and blanketing may be used on flatter slopes when deemed necessary such as at landfills or highly erodible slopes. Mulch will not be used with soil erosion control blankets.

3.4.1 Soil Preparation

The surface of ditches and slopes to receive soil erosion control blankets shall be finished to a smooth and even condition with all debris, roots, stones, and lumps raked out and removed.

3.4.2 Placement of Soil Erosion Control Material

3.4.2.1 General

Soil erosion control blanket shall be unrolled and placed with the netting on top. Apply wire staples vertically through the netting and blanket into the ground, keeping netting taut against anchor staples. Erosion control blanket placement shall be accomplished without damage to the installed material or distortion of established grades.

3.4.2.2 Ditches

Erosion control blanket shall be laid with all overlaps in the direction of water flow, or with the manufacturer's specifications. The manufacturer's specifications shall be provided to the CONTRACTOR prior to installation.

3.4.2.3 Slopes

Erosion control blanket may be laid horizontally or vertically on the slope and secured as manufacturer's specifications require. The manufacturer's specifications will be provided to the CONTRACTOR prior to installation.

3.4.3 Maintenance

The erosion control blanket shall be maintained until all work on the entire contract or designated portion thereof has been completed and accepted. Maintenance shall consist of the repair of eroded areas and the repair or replacement and restapling of loose or undermined erosion control blanket, including reseeding.

3.4.4 Soil Erosion Control Fence

Erosion fence shall be installed to reduce sediment loss. A 6-inch deep trench shall be dug just outside the posts for the full length of the silt fence. Set the studded "T" posts a maximum of 8 feet on center. Incline the posts toward the runoff source at an angle of not more than 20 degrees from vertical. Drive the posts into the ground so that no more than 3 feet protrudes about the ground. Attach the fabric to the posts, and place the fabric into the trench and backfill and compact the soil. All splice joints shall overlap a minimum of 18 inches.

3.4.5 Straw or Hay Bales

Straw or hay bales shall be installed in those areas required to control sheet or gully erosion.

3.5 PROTECTION AND CLEANUP

After seeding and mulching operations have been completed, barricades and approved warning signs shall be erected as required to provide protection against traffic and trespass. Excess material from seeding and mulching operations, and all debris, shall be cleaned up and disposed of off the site at an approved location.

3.6 ESTABLISHMENT AND MAINTENANCE

3.6.1 General

The SUBCONTRACTOR shall be responsible for the accomplishment of the specifications in Division 2. Proper maintenance shall include protection of embankments and ditches from erosion, and maintenance of the mulch covering up to the completion of the final inspection.

3.6.2 Protection of Seeded Areas

Immediately after seeding, the area shall be protected against traffic or other use by erecting barricades, as required, and placing approved signs at appropriate intervals until final acceptance.

3.6.3 Reseeding and Repair

During the maintenance period, any eroded or otherwise damaged areas shall be promptly repaired to reestablish the end condition specified herein. Repair shall include all the operations indicated for the particular area involved to produce the end result specified prior to damage.

3.7 FINAL ACCEPTANCE

Final inspection and acceptance will take place when the CONTRACTOR has completed all procedures outlined in the contract. Acceptance will be based upon compliance with seedbed preparation, seeding and mulching as defined in paragraph 3.6.